

9
ANEURISMS

OF

THE ARTERIA INNOMINATA;

THEIR HISTORY AND DIFFERENTIAL DIAGNOSIS FROM ANEURISMS

OF THE ARCH OF THE AORTA.

BY

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NOTE.

The following list of Journals is given in order to prevent those who may continue the investigation of this subject from searching through volumes that have been carefully examined. Among the many periodicals still requiring examination I wish to refer to the *Repertorium der Gesammten Dutchen Medizinisch-Chirurgisch Journalistik*, by Nenmeister, for 1830, part vii. p. 119; and for 1831, part iii. p. 71; part v. p. 114; and part vi. p. 100, to which I found references for cases of innominata aneurism, but unfortunately these volumes were not in any of the Parisian libraries: to the liberality with which these Institutions are opened to foreigners, and to the kindness of the librarians at the *Faculté de Médecine*, I am indebted for having had the opportunity of making these researches.

British and American Journals from 1752 to 1851.

American Journal of Medical Science.	Medical Gazette.
American Medical Recorder.	Medical Intelligencer.
British and Foreign Medical Review.	Medical Observations and Inquiries.
Dublin Hospital Gazette.	Medical Times.
Dublin Hospital Reports.	Medico-Chirurgical Review.
Dublin Journal of Medical Science.	Medico-Chirurgical Transactions.
Dublin Medical Press.	Provincial Medical and Surgical Journal.
Edinburgh Medical and Surgical Journal.	Quarterly Journal of Foreign Medicine and Surgery.
Edinburgh Monthly Journal of Medical Science.	Transactions of King and Queen's College of Physicians, Ireland.
Guy's Hospital Reports.	Transactions of a Society for the Diffusion of Medical Knowledge.
Lancet.	Transactions of the Medical and Surgical Society of Calcutta.
London Medical Repository.	
Medical and Physical Journal.	
Medical Commentaries.	
Medical Essays and Observations by a Society in Edinburgh.	

Danish, from 1777 to 1818.

Acta Regiæ Societatis Medicæ, Hauniensis.

French Journals from 1795 to 1851.

<i>Annales de la Chirurgie Française et étrangère.</i>	<i>Journal Générale de Méd. de Chir. et Pharmacie.</i>
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- Annales de la Société de Médecine de Gand.
- Annuaire Médico-Chirurgicale des Hôpitaux de Paris.
- Archives Générales de Médecine.
- Bibliothèque de Planque.
- Bulletin de l'Académie Nationale de Médecine.
- Bulletin de la Société Anatomique de Paris.
- Bulletin des Sciences Médicales.
- Gazette des Hôpitaux.
- Gazette Médicale de Paris.
- Gazette Médicale de Strasbourg.
- Journal Analytique de Médecine.
- Journal de la Section de Médecine de la Société Académique de la Loire-Inférieure.
- Journal de Médecine, par M. Beau.
- Journal de Médecine et de Chirurgie Pratique.
- Journal des Connaissances Médico-Chirurgical.
- Journal Hebdomadaire des Progrès des Sciences Méd.
- La Clinique, Annales de Méd. Universelle.
- L'Examineur Médical.
- L'Expérience, Journal de Méd. et Chir.
- La Presse Médicale.
- L'Union Médicale.
- Mémoires de l'Académie Nationale de Méd.
- Mémoires de la Soc. de Chirurgie de Paris.
- Mémoires de la Soc. Méd. d'Observations.
- Recueil de Mém. de Méd. de Chir. et de Phar. Militaires.
- Répertoire Annuel de Clinique Médico-Chirurgicale.
- Revue Médicale Française et étrangère.
- Thèses pour le Doctorat en Médecine présentées à les Facultés de Médecine de Paris et de Montpellier, depuis 1800.

German Journals from 1808 to 1851.

- Allgemeines Repertorium der Medizinisch-Chirurgischen Journalistik des Auslandes.
- Bibliothek der Praktischen Heilkunde, by Hufeland and Himly.
- Jahrbücher der Ausländischen Gesammten Medizin, by Richer and Winter.
- Journal der Chirurgie und Augenheilkunde, by Gräfe and Walther.
- Journal der Practischen Heilkunde, by Hufeland and Osann.
- Magazin der Ausländischen Literatur für Heilkunde, by Gerson and Julius.
- Medicinische Jahrbücher K.K. Oesterreichischen Staats, by Well and Rosas.
- Repertorium der Gesammten Deutschen Medizinisch-Chirurgisch Journalistik, by Kleinert and Neumeister.
- Rheinisch Jahrbücher der Medicin und Chirurgie, by Harles.
- Zeitschrift für die Gesammte Medicin mit besonderer Rücksicht auf Hospitalpraxis und Ausländische Literatur, by Dieffenbach, Frick, and Oppenheim.

Italian Journals from 1814 to 1851.

- Annali Universali di Medicina, Omodei.
- Giornale per Servire ai Progressi della Patologia e della Terapeutica, Venezia.

ANEURISMS

OF

THE ARTERIA INNOMINATA.

AMONG the many problems in diagnostic medicine requiring solution, not one probably possesses so high a practical or scientific interest, whose history has remained so long unwritten, and whose diagnosis rests on a basis so inaccurate, as that which forms the subject of this paper; and, while much must of necessity have escaped my notice, in a search for materials widely scattered through the medical periodicals of Europe and America, still I trust, that the earnestness of this attempt to fill up a gap in our medical literature will plead for these deficiencies.

The works of Hodgson and of Guthrie do not contain even an account of the cases of innominate aneurism on record when they wrote; Wardrop, in his book on Aneurisms, offers some suggestions regarding the diagnosis of these affections; but it is to Dr. Crisp's work on the Diseases and Injuries of the Blood-vessels that we must refer for accurate statistical information, as well on this as on all diseases belonging to the same category.

The literature of this subject, in French, consists of the following inaugural dissertations: M. King's, 1828; M. Poyer's, No. 100, 1839; M. Beistegui's, No. 195, 1841; and M. Lesage de Lahaye, No. 58, 1845.

M. Velpeau, in his article on Subclavian Aneurism, in the *Dictionnaire de Médecine*, vol. xxviii. p. 466, refers to some

of the cases of aneurism of the innominata, already published by M. Roberts, in his monograph, "Sur les anévrysmes de la région Sus-claviculaire, 1842," as well as to those quoted by M. Beistegui. It is to M. Dubrueil (Professor to the Medical Faculty of Montpellier), however, that we are indebted for the first important suggestions regarding the diagnosis of these aneurisms from those of the arch of the aorta^a.

In the *Theoretisch-praktisches Handbuch der Chirurgie*, by Rust, vol. ii. page 57, we find a short article on innominata aneurism. Neither Morgagni nor Searpa have left us even pathological details of these lesions, and, as far as I can learn, there is no article on this subject in Italian. It is imperative on any one, before taking the diagnosis of this disease into consideration, to collect all that has hitherto been laid before the medical world on the subject; for, if it be true that successful treatment depends upon correct diagnosis, and that this latter can only be effected by having an accurate knowledge of the history of disease, it becomes a matter of all importance that, before we inquire what are the characteristic phenomena of these aneurisms, we should place some ground under our feet; empiricism in practice being less dangerous than generalization made on imperfect or insufficient data. This must be my apology for the following extracts from the English, American, French, German, and Italian journals, condensed as much as is consistent with accuracy.

No. 1. Mr. WARDROP's *Case, from Lancet for July, 1827*, page 465^b.—Mrs. A. aged 45. A pulsating tumour, the size of a turkey's egg, presents itself in the neck, at the inner side of the sterno-mastoid muscle, its base being under the upper portion of the sternum. No pulsation can be discovered in any of the branches of the right carotid artery, although they have been most minutely examined; but in those of the left the circulation is extremely vigorous. The

^a I have to thank Professor Dubrueil for having, at great personal trouble, forwarded to me the last copy of his work, entitled, "Observations et Réflexions sur les Anévrysmes de la Portion Ascendante et de la Crosse de l'Aorte, 1841."

^b The conclusion of this case is given in the second volume of the *Lancet* for 1828-29, page 788.

contents of the thorax were found to be in a healthy condition, except at the upper part of the sternum, over a confined space under the clavicular edge of the sterno-mastoid muscle, where a *bruit de soufflet* could be heard. There was severe pain through the left side of the head and neck, with a throbbing sensation in the tumour. She has at times great difficulty of respiration, and her nights are very restless; countenance expressive of great anxiety; pulse frequent, full, and throbbing. The disease commenced eleven years ago with difficulty of respiration, cough, and severe pains in the chest, head, and neck, which she considered to be rheumatic. Five months afterwards, she observed a pulsating tumour above the sternum, which has increased rapidly during the last three weeks, and the integuments covering the apex of the swelling have within a few days become painful. A fortnight ago, pressure had been made on the humeral artery by means of Mr. Searle's instrument, to diminish the current of blood through the aneurismal tumour; but the patient could bear the necessary pressure only for a short time. The subclavian was tied July 6. On the 8th of August, 1828, no tumour was perceptible in the situation of the aneurism, but a feeling of hardness was perceived at the root of the neck, arising, no doubt, from a condensation of the aneurismal tumour. Pulsation had returned in the right carotid, but with much less force than in that on the left side. The right radial artery beats with about half the strength of the left; the pains in the neck, shoulder, and back have disappeared for some time; her feet are no longer œdematous, and she takes exercise daily. About three months after, a tumour arose immediately above the sternum, occupied the centre of the neck, and some months after that a second tumour appeared, occupying the site of the right carotid artery, and extending up the right side of the neck, while its base united with that of the other tumour. She died 13th September, 1829. *Post mortem.*—The aneurism extended from the origin of the innominata to its bifurcation. The aorta, of the natural size, had a few points of ossification on it. Right carotid pervious and quite healthy. The subclavian is divided, and both ends closed where the ligature had been applied. The tumour, as large as a turkey's egg, occupied the central space between the two sterno-mastoid muscles, adhered firmly to the sternum, and had caused absorption of a portion of that bone.

No. 2. Mr. EVANS' Case, *Lancet*, 1829, page 187.—A butcher, aged 30, very athletic, enjoyed perfect health up to the period of an attack of bronchitis, when, in a paroxysm of coughing, on the 10th March, 1828, a soft pulsating tumour, the size of a walnut, appeared, covered externally by the sternal portion of the sterno-mastoid muscle. The force of its pulsations was increased by making pressure upon the right subclavian artery, while pressure on the right carotid, diminished or even sometimes completely arrested the pulsations. Right carotid and subclavian pulsate stronger than those on the opposite side, but the radial arteries appear to be of

equal strength. The cough and dyspnœa ceased to be troublesome as soon as the tumour appeared. Chest sounded well on percussion, and the respiratory murmur was distinctly audible at all points. A loud pulsation was heard over the tumour, unattended by any unusual sound. Mr. Evans diagnosed, that the root of the carotid was the seat of the disease. Valsalva's treatment was used, but as the tumour continued to increase in size, it was considered advisable to tie the carotid on the 22nd July, 1828. After the operation the pulsation of the tumour continued as before. During the two following days the pulsation was stronger than before the operation, and the right radial artery beat more forcibly than the left; on the third day he became feverish, pulse 120. On the 29th July (the seventh day after the operation) the right pulse became weaker than the left, intense pain was complained of in the course of the axillary and brachial arteries, which ended in the obliteration of these vessels. The right arm wasted, became partially paralysed, and not until the end of the third week were the anastomosing vessels seen pulsating on the back of the hand; as these vessels enlarged, sensation and volition slowly returned. The same set of phenomena occurred in the course of the right carotid; the right side of the head and face becoming emaciated, and remaining so for some time. Salivation set in without apparent cause on the 29th July, and continued until the middle of September. In the first week of October, the tumour is reported to be hard, firm, diminished a third of its volume, and pulsation scarcely perceptible, even on pressing deeply. On leaving his bed for the first time, a general numbness and debility of the right side was observed, which entirely disappeared thirteen weeks after the operation; but his temper remained irritable and his memory was evidently weakened. From the 22nd October, he attended market regularly at a distance of seven miles, and finally recovered his usual health.

No. 3. Mr. RAY's Case, *Lancet*, 1835, page 498.—A sawyer, aged 52, although a hard drinker, enjoyed good health until struck by a heavy piece of timber on the upper part of the chest, which threw him forcibly backward against the axle of a waggon. Since this accident he always complained of a constant, dull, gnawing sensation at both of the points where he had been struck. Various treatment was used, and in September his sufferings increased, dark coagulated blood being frequently ejected during fits of coughing. He soon became unable to use the left arm or lie on the left side, and finally could not remain lying down. On 12th November he coughed up a large quantity of blood, became comatose, and died. *Post mortem*.—Left pleural cavity full of blood; the lower part of this lung had an appearance resembling the spleen, and in its interior was a cavity capable of containing two ounces of fluid. A large aneurism arose from the descending aorta between the sixth and eighth dorsal vertebræ; it had completely absorbed two inches of the seventh rib and half-an-inch of the eighth. The entire of the innominata formed one vast

aneurism the size of an orange, on whose anterior surface was found an ulcerated opening large enough to admit an egg; the sternum had been so much absorbed that it broke transversely on being raised.

No. 4. Mr. FEARN'S Case, *Lancet*, 1836, page 129.—A female, aged 28, soon after a violent fit of coughing, felt a throbbing swelling above the sternum; on her admission to the Derby Infirmary, a rounded pulsating tumour was seen immediately above the sternum, bounded laterally by the trachea and the tracheal margin of the sterno-mastoid, evidently making pressure on the trachea near its bifurcation, as evinced by loud wheezing, frequent cough and difficulty of breathing. A loud *bruit de soufflet* was heard in the supra-clavicular space, and a less distinct *bruit* along the course of the common carotid. The *bruit* in the subclavian artery was rendered louder by stopping the passage of blood through the carotid; but when the circulation through the subclavian was arrested, the *bruit* in the carotid ceased. The tumour itself emitted sounds similar to and synchronous with those of the heart. The pulse in the right wrist was very indistinct; that in the left being of the natural strength and frequency. Pressure on the carotid rendered her breathing in a marked degree more free; the same experiment applied to the subclavian did not alter the respiration in the least; but on another occasion, pressure on the subclavian increased her difficulty of breathing. When both vessels were compressed at the same time, the relief was much about the same as experienced when the carotid alone was pressed upon. Mr. Fearn, therefore, selected the carotid for operation, and put a ligature round it, August 30th. A month after: the patient sleeps well; walks out every day; her difficulty of breathing is entirely removed; the tumour still pulsates distinctly, but pressure upon it does not give rise to dyspnoea or inconvenience of any kind; she returned home at her own request.

No. 5. Mr. MAXWELL'S Case, *Lancet*, 1841, page 594.—A compositor, aged 41, a few days after lifting a considerable weight, felt stiffness and pressure at the upper part of the chest. Mr. Maxwell, on examining him, perceived a slight swelling above the sternum, pulsating strongly; no cough; breathing free. The author says: "I then saw it was an aneurism of the arteria innominata;" but as an hospital surgeon in consultation stated it as his belief, that the disease extended to the arch of the aorta, medical treatment was alone had recourse to; the patient sank gradually, and died 3rd July, 1841, not from the bursting of the aneurism, but from exhaustion. *Post mortem*.—An aneurismal sac, the size of a large lemon, arose from the innominata, and formed close adhesion to the sternum. The orifice from the artery into the sac was three-quarters of an inch in length and a quarter in width. Its margins were rounded as if it was a natural opening. The aorta, heart, and other viscera were healthy, with the exception of some serum effused into the pleura and pericardium, as the result of great debility.

No. 6. Dr. WHITING'S Case, *Edinburgh Medical and Surgical Journal*, vol. xvii. page 81.—A man, forty years of age, whose general health

had been good, about three years previously to his death laboured under constant difficulty of breathing, which was much increased by all muscular exertions. He was troubled with a harsh, crowing cough, and expectorated much mucus, sometimes streaked with blood. To these symptoms were added, difficulty in swallowing solid food, and intense darting pain extending from the front of the ear along the right side of face and head; feels faint if he sits up for more than fifteen minutes. A short time before death the pulse at the right wrist was found intermitting; the left was not examined. He was subject to frequent attacks of catarrh, which invariably aggravated his sufferings; the strongest muscular efforts being often necessary to carry on respiration. At last, nature seemed to be exhausted in the effort to maintain the action of the lungs, and he died with catarrhal symptoms.—*Post mortem*.—The muscles of the chest and abdomen were unusually large and florid; the intercostals being particularly so; the bronchi were filled with mucus, and their mucous membranes slightly inflamed. An aneurism of the innominata lay behind the upper extremity of the sternum, and a little to its right side; perfect union had taken place between the sac and the trachea, the cartilages of which had been absorbed, and a smooth, red, oval tumour appeared within the tube, diminishing its caliber by more than half. (This paper is illustrated by two well-executed drawings, showing the anterior and posterior view of the tumour.)

No. 7. Dr. AUCHINCLOSS' Case, *Edinburgh Medical and Surgical Journal*, vol. iv. page 338.—A plumber, aged 64, had been in the habit of carrying heavy loads of lead on his shoulders. Immediately behind the sterno-clavicular articulation was a strongly pulsating tumour, somewhat larger than a hen's egg; extending in the course of the carotid and subclavian arteries to the inner edge of the scaleni; there was no pulsation in the subclavian beyond the acromial side of these muscles, in the axilla, nor anywhere down the right arm; there being numbness and frequent shooting pains in this limb. Frequent dry, tickling cough, hoarseness of voice, and dyspnoea prevented sound sleep. In April, 1833, he became affected with pain in the right shoulder, which he considered as rheumatic, and about the same time a tumour, the size of a Spanish nut, appeared above the clavicle, near to the sterno-clavicular articulation. In October he fell from a scaffold, and from that period the tumour increased in size, and the pain in intensity, until the beginning of June, 1834, when it was fully one-half larger than a child's head at birth, occupied the entire of the right side of the neck, from the clavicle and sternum to the lower margin of the jaw, had pushed the larynx and trachea nearly two inches to the left side, and finally became conical, with three nipple-like projections on its surface. He died on the 20th June, while raising himself to expectorate. Almost immediately after death, the aneurismal swelling began to subside, and in less than an hour the cyst was empty, presenting a great hollow depression, with thickening around its circumference, particularly at the lower part. *Post mortem*.—The sterno-mastoid was very

much stretched, pushed to the right side, and partly spread over that portion of the circumference of the tumour; the aneurism was found to engage the upper two-thirds of the innominata, the whole length of the common carotid to its bifurcation, and the subclavian to the inner edge of the scaleni. The dilatation involved the whole circumference of the carotid and subclavian, while the tumour on the innominata engaged only the anterior half of its circumference. The posterior aspect of the aneurism was close to the spine, and had pressed the larynx and trachea fully two inches to the left side; the posterior surface of the upper end of the sternum and inner half of the clavicle was partly absorbed, with destruction of the corresponding part of the cyst anteriorly; in this situation there was a considerable deposit of laminated coagulum. The subclavian was obliterated to an extent equal to the breadth of the scaleni, and so completely incorporated with these parts as to form apparently one structure. The innominata, beyond the seat of the disease, as also the aorta, was greatly enlarged. The upper lobe of the right lung was adherent to the lower and posterior part of the innominata. Considerable effusion existed on both sides of the chest; the bronchi contained much puriform mucus, and their inner lining was very red. The immediate subsidence of the aneurismal swelling after death, which was supposed to be caused by rupture having occurred internally, is to be explained, by the fluid contents of the sac receding towards the aorta, and passing readily into the large vessels of the chest and abdomen. The severe hemicranial pain, which he said was the most distressing symptom, is accounted for by the overstretching of the sterno-mastoid muscle, and the consequent pressure made on the spinal accessory and descending branches of the portio dura.

No. 8. Dr. HENDERSON'S *Case, Monthly Journal of Medical Science*, 1843, page 453.—A woman, aged 59, suffered from palpitations for eight years; a violent attack of vomiting rendered them much worse, and she felt at the time as if something had given way within her chest; since then she complained of pain in the cardiac region, and great difficulty of breathing. Five months before, she was seized with a paroxysm of cough, which returned at intervals up to the time she was seen; it had been since the cough came on, that she noticed a swelling below the sternal end of the right clavicle. On admission to the Royal Infirmary of Edinburgh, a pulsating tumour was seen, commencing immediately above the cartilage of the third right rib, extending two inches above the sternal end of the right clavicle, and outwards to an inch and a quarter from the right sterno-clavicular articulation. Dulness on percussion all over the region occupied by the tumour. Above the clavicle a very obscure murmur was heard accompanying the diastole of the tumour, below the end of the right clavicle, a feeble, musical cooing sound began to accompany the systole of the tumour, becoming more distinct towards the fourth left cartilage; the cooing character of the sound was only occasional, the second sound, near the fourth left cartilage, being for the most part a bellows murmur, and both these sounds became

feebler, the more the apex of the heart was approached. A lengthened interval was at times to be distinguished between the stroke of the heart and the radial pulses; this interval becoming longer as the action of the heart became quicker. Pulse rarely intermittent, but stronger in the right than in the left wrist. She died soon after, and the *post mortem* examination showed the heart to be dilated, especially the left ventricle; one of the aortic valves had become folded back, and allowed of regurgitation; the aorta was somewhat dilated, and the innominata transformed into an elongated sac, the size of a large pear, its communication with the aorta being of considerable size.

No. 9. Dr. CAMPBELL's *Case, Monthly Journal of Medical Science*, 1845, p. 45.—An intemperate soldier, aged 48, suffered for years from pains in his right shoulder, and right side of neck and head. A fortnight before he consulted Dr. Campbell, while splitting wood with the axe at full stretch above his head, he felt something give way in the lower part of the neck, attended with sudden gasping for a few seconds, and on putting his hand to the part he found a small pulsating tumour, which he would not have noticed but for its rapid growth. Dr. Campbell discovered a pulsating tumour lying transverse to the axis of the neck, appearing at the tracheal as well as at the external side of the sterno-mastoid muscle, and to be felt pulsating within the chest, as low as the cartilage of the second rib. Compressing the right carotid artery arrested pulsation in the tumour; pressure on the right subclavian produced the same effect, but in a less marked degree. The radials, subclavians, and carotids pulsated equally strong on both sides. The right subclavian space sounded dull, and over this region a double pulsation was heard, growing weaker as the heart was approached and accompanied by a very slight *bruit de soufflet*; but neither thrill nor *bruit* could be heard in the tumour above the clavicle. Aneurism of the innominata was diagnosed, and as compression on the carotid had the greatest effect in restraining the circulation through the tumour, it was determined to tie that vessel, which was accordingly done on 8th March. For some minutes after the ligature was tied the aneurismal swelling entirely disappeared; however, only a short time had elapsed before it returned, but to a less extent than before the operation. Severe pain in the right side of the head, and dilatation of the left pupil occurred immediately after the tightening of the ligature; cough and feverishness set in three hours afterwards, and a bleeding was used with advantage; and he went on well until the 23rd, when fever returned, with slight delirium; heart acting most violently; when blood was again taken, and he seemed relieved until the 27th; he was then seized with intense dyspnoea; his face became livid; pulse 150, very small, and two pulsating tumours were felt rising one on each side of the sternum. He died the same evening. *Post mortem*.—A tumour was found occupying the superior portion of the right side of the chest, and extending half-an-inch beyond the centre of the first bone of the sternum. The aneurism commenced at the root of the innominata, involving the entire of its anterior wall to within a quarter

of an inch from its bifurcation, and also the transverse portion of the arch, to where the left carotid was given off, its origin being slightly dilated. The sternal ends of the clavicle and of the first rib were denuded of their periosteum, and the first bone of the sternum was deeply hollowed out by the pressure of the sac. The remains of two small pouches arose from the large tumour, one anterior and the other posterior; the sacs of these aneurismal pouches were found empty and collapsed. The entire of the aorta, as low down as the diaphragm, was dilated and contained ossific deposit; the right carotid was nearly divided, and plugged by a firm coagulum for two inches below the ligature. The superior part of the right lung was condensed from the pressure of the tumour; the left lung in the first stage of pneumonia; the left ventricle hypertrophied; aortic valves healthy.

No. 10. Mr. LYON's Case, *Monthly Journal of Medical Science*, 1847, page 229.—A man, aged 43, suffered for the last six weeks from pain in the back of his neck and right shoulder; two weeks since there was observed some swelling at the lower part of the neck. A strongly pulsating tumour, the size of a small fist, occupied the neck, from the right side of the thyroid gland to the sternum, and extending laterally under the inferior portion of the sterno-clavicular muscles; pressure diminished the size of the sac, but it again expanded as soon as the pressure was removed. Pulsation of the carotids normal, that of the right subclavian and radial scarcely to be felt. No *bruit* at any part of the tumour; action of heart healthy; no dulness on percussion, or absence of respiration over any part of the chest. It was agreed in consultation, that the tumour depended on dilatation of the innominata, and Brasdor's operation was proposed; but the patient would not submit to it. Pressure was applied by means of a half-circle of steel-spring, with a button and screw over the vessel, and a plate for obtaining counter-pressure behind, sufficiently large to avoid the lateral part of the neck; he was directed to use the apparatus as often as possible, and firmly enough to interrupt pulsation in the temporal artery of the right side. Previously to applying this instrument, he had been twice bled, and was put on the use of digitalis and acetate of lead, with low diet, rest and purgatives; all these were continued, except the bleeding. On the 27th December, 1843 (being the twenty-fifth day after the use of compression), the tumour had diminished in size; it pulsated much less forcibly; was much firmer and undiminished by pressure; pains less troublesome; voice not so hoarse, and swallowing easier. Right subclavian pulse smaller than at the former examination; he uses the collar generally for an hour and a half at a time, and in all for about eight or nine hours in the twenty-four. January 4th, 1844: Health good; pains gone; voice and deglutition normal; pulse small and soft, 80; pulsation in the sac scarcely perceptible; right carotid patent; radial permeable, but its pulsations exceedingly weak. Suffers no inconvenience from the pressure of the instrument. December 24th: A cast was taken and compared with one that had been made just twelve

months before, when it was found that the tumour had diminished two-thirds in all directions.

July, 1845: Gets constantly drunk; is often very violent; all treatment now neglected; he died suddenly on the 26th July. *Post mortem*.—The aneurismal tumour, the size of a cocoa-nut, formed by the innominata (the aorta being very slightly involved) extended from the cricoid cartilage to the arch of the aorta; its parietes on the right side are as thin as writing paper, and in them is a rent an inch long, through which fatal hemorrhage had occurred into the right pleural cavity. Above, the tumour is closely attached to the sterno-clavicular articulation and filled with fibrine; the other parts of it contained soft coagulated blood; below, the sac is fused into the commencement of the arch, and the left carotid arises from its lower and anterior border. The right carotid and subclavian arteries are both pervious, arising from its upper and posterior part.

No. 11. Dr. WISHART's Case, *Monthly Journal of Medical Science*, 1848, p. 496.—A labourer, aged 40, stated he had lost his voice from cold. "On applying the fingers over the clavicles, a distinct murmur was perceived extending up the neck; over the superior part of the sternum a strong impulse, accompanied with a *bruit*, was felt, synchronous with the stroke of the heart." The pulse in the right wrist was barely perceptible. Together with these symptoms of aneurism, he had acute bronchitis, for which he was more immediately treated, and discharged from the Middlesex Hospital in the beginning of August, 1844. When seen by the author on the 17th August, 1844, his symptoms were, great dyspnoea, suffocating cough, inability to raise his voice above a whisper, moist râles over both sides of the chest, a strong impulse felt over the top of the sternum, and the pulse in the right wrist not perceptible. The treatment was directed towards the disease of the lungs; he was put on very low diet, and took small doses of acetate of lead daily for some weeks. Towards the end of this year, only a very slight impulse could be felt over the sternum. He had repeated attacks of hemoptysis connected with the state of his lungs, which were then in an advanced stage of phthisis; for a month before his death (which occurred on the 21st of February, 1845), no pulsation could be felt in either of the carotids; but for how long previously to that time it was absent, the author could not say.

Post mortem.—Both lungs full of tuberculous cavities; the aneurism involved the whole of the anterior of the innominata, and had been spontaneously cured, the innominata being entirely obliterated; the sac of the aneurism (larger than a duck's egg) was completely filled with compact fibrine, deposited layer on layer, so as to fill the interior to the level of the aorta. The orifice from the aorta into the innominata was as large as a crown-piece; the aorta was also somewhat expanded, and there existed an extensive deposit of atheromatous matter in its coats. Fibrine occupied a small extent of the interior of the aorta, so as completely to cover the orifice of the left carotid, which together with the right carotid and subclavian, was

entirely blocked up; the left vertebral and subclavian arteries were somewhat enlarged. The right common carotid was slightly contracted and filled with fibrine for about four inches above the aneurism. The right subclavian and the branches of the thyroid axis, vertebral artery, &c., were pervious, and of their usual caliber. The tumour adhered firmly to the front and right side of the trachea, and had slightly diminished its size; the mucous membrane of this part of the air-tube was of a reddish brown colour; a few points, about the size of pins' heads, were raised, as if at one time the aneurism had a disposition to burst into the trachea. The pneumogastric nerve adhered closely to the sac in front, and was considerably stretched. (The preparation is in the Museum of the Medical Department of the Army, at Chatham.)

No. 12. Mr. Luke, Surgeon to the London Hospital, has kindly forwarded to me the following particulars of a case, treated by him in private practice:

A shoemaker, of short stature, between thirty and forty years of age, was supposed to be labouring under rheumatism of the right shoulder, and had been treated in conformity with that opinion. On examination, Mr. Luke found a pulsating tumour, as large as a moderately-sized orange, above the right sterno-clavicular articulation, which he immediately recognised to be aneurismal. Ten ounces of blood were taken from the arm, cold lotion applied to the swelling, and digitalis administered internally; the diet was also restricted, but not very rigidly. The bleedings were repeated; first at short, afterwards at longer intervals, the quantity drawn being each time gradually diminished, until not more than four or six ounces were taken; this being found sufficient to control the force of the circulation; the pulse was carefully watched, and the bleedings regulated by its strength, care being taken *never to carry it so far as to distress the patient, or induce a feeling of nausea*. This treatment extended over some months, the pulsations of the tumour, which even from the first began to diminish, eventually disappeared altogether, leaving merely a fulness of the part in their place. The patient survived (what Mr. Luke concluded to be a cure) for two years, and died from an attack of phrenitis. The preparation is in the London Hospital Museum, and shows the aneurismal sac, commencing from the innominata just before its division into the carotid and subclavian arteries, extending forwards and a little outwards, overlying the anterior scalenus muscle, and covered by the lower extremity of the sterno-mastoid. The right carotid artery is impervious, but the subclavian would admit blood to pass through it; the sac is laid open by incision, and its cavity is seen to be *completely* filled by a uniformly dense fibrinous mass, without any central space, containing soft coagulum; it is, therefore, permanently closed against any admission of blood from the arteries.

No. 13. Dr. HUGHES' Case, *London Medical Gazette*, 1838, page 205.—A man, aged 40, had suffered from cough for five years, and observed a pulsating tumour above the right sterno-clavicular arti-

eulation six months ago. When seen by Dr. Hughes, "he presented the general symptoms and physieal signs of aneurism of the arteria innominata, together with consolidation of the upper lobe of the right lung, and a feeble heart." About a fortnight after, the tumour disappeared during the night, and could never again be discovered; at the same time dyspnœa increased, the expectoration become more abundant, and was for two or three days tinged with blood; dysphagia now for the first time appeared; still he lived for four months after the disappearance of the tumour.

Post mortem.—The upper lobe of the right lung, consolidated from old pneumonia, contained in its centre an irregular cavity, and a few scattered tubercles. From the right side of the innominata proceeded an aneurism, as large as a chesnut; from its left side, and partly from the arch of the aorta arose another aneurism, as large as a hen's egg, pressing upon, and having an ulcerated opening into the trachea. To the left of the left subclavian was a third aneurism, as large as a walnut; the ascending aorta was much enlarged and diseased; the right subclavian was also enlarged; the right carotid natural; the left carotid very small, and its mouth completely closed; the mouth of the left subclavian also had been recently, but entirely, closed by the pressure of the aneurism near it.

The three following cases were laid before the Royal Medical and Chirurgical Society by Mr. SHAW. *London Medical Gazette*, 1840, page 518:

No. 14. A sailor, aged 50, admitted under Dr. Budd, May 9th, 1839. When first seen, no tumour was apparent, but a pulsation was felt at the upper part of the sternum, and under the sternal end of the clavicle; still the hollow space below the clavicle, and the depression between the insertions of the sterno-mastoid were more filled than natural, and pain was complained of when these parts were pressed. The superficial veins in front of the neck, on the right side, were preternaturally dilated. The pulse could not be felt in the right arm, either above the elbow or at the wrist, while in the left arm it was strong, beating 76. The pulsation of the carotid and temporal arteries was equally strong on both sides; pain in the right side of the neck to some distance upwards, and numbness of the right arm; voice hoarse, and he was troubled with a dry, teasing cough; slight difficulty in swallowing. He stated that he had been ill for four months, and that the pain (where the pulsation was felt), together with the hoarseness, came on suddenly. Two months after his admission, the sternal end of the clavicle appeared pushed forwards, and in December a tumour rose above the clavicle, and also descended below it; that bone forming a depression in its centre; orthopnœa; voice as low as a whisper; right arm and hand œdematous, acute pain in them beside numbness. Later in the case, the œdema extended to both arms, neck, and face; he constantly repeated "that the pain in the right arm would drive him mad;" the tumour increased, the skin over it became red, and rupture exter-

nally was expected; he died January 22nd, 1840, exhausted from pain and dyspnœa.

Post mortem.—The tumour was eight inches in length, measured obliquely from its origin at the root of the innominata to within three inches of the acromial process of the clavicle; reaching four inches above the sternum, and extending as many inches below that bone; one lobe of the tumour descended into the chest, as low as the third rib; another pouch projected backwards, so as to press on the trachea. The clavicle was perfectly detached from the sternum, and moved freely in the centre of the tumour, surrounded by coagulated blood; a portion of the first rib and sternum were likewise absorbed. The innominata came off from the arch, of its normal size, and then immediately dilated into the aneurism; a small aneurism, large enough to contain a nutmeg, was formed in the arch immediately above and behind the orifice of the innominata; so that part of the parietes of that vessel formed the septum between the great aneurism and this smaller aortic one. The right carotid was normal, opening obliquely into the sac; the orifice of the right subclavian was completely obliterated, nothing but a slight depression marked its former position; it was impervious for half-an-inch from the sac, but when it reached the axilla, its caliber was of the usual dimensions. The vertebral artery, the thyroid axis, and internal mammary were impervious at the point where they were given off from the subclavian. The right axillary vein was found behind the tumour, diminished to the size of a crow-quill, it was seen to enter the walls of the sac, and to be gradually lost in their substance; no vestige of the right subclavian vein could be found to mark where it joined the right vena innominata; the jugular and brachiocephalic veins were also remarkably contracted; the left brachiocephalic vein encircled the fore-part of the tumour, and was so small as not to allow a No. 10 bougie to pass along it. The axillary plexus of nerves was involved in the walls of the tumour at its back part. The areolar tissue which surrounded the nerves had the appearance of being inflamed: it was infiltrated with serum, and even partly broken down, to form an abscess. The right par vagum was traced into, and lost in the walls of the sac; the recurrent nerve was flattened by, and involved in the parietes of the aneurism, but it was impossible to say whether these nerves preserved their continuity to their destinations.

No. 15.—A man, aged 33, admitted to the Middlesex Hospital, in March, 1838, under Dr. Watson's care; his countenance was remarkably turgid, and eyes projecting; veins of the ears, lips, and nose of a purplish colour; the jugulars unusually full: the superficial veins all over the chest and abdomen enlarged; but those on the right side were more tortuous than on the left. Independent of the fulness caused by the blood-vessels, there was a distinct tumid appearance in the neck, above both clavicles, produced (as was found upon dissection) by an enlargement of the lymphatic glands situated there.

The pulse at the wrist was considerably smaller and weaker on the right than the left side. No external tumour, having any pulsation, could be perceived, although the most careful examination was made. About the middle of the upper portion of the sternum the ear, at each systole of the heart, was distinctly jarred, though with less force than in the precordial region; but in the space intermediate between these two points, no similar jarring sensation was perceived; nevertheless, the heart could be heard beating at this part, accompanied by a slight bellows sound. Dr. Watson considered, that the jar communicated to the ear at the upper part of the sternum indicated the swelling out of an aneurismal pouch in that situation, when the sac was filled by the contraction of the heart. He died five months after admission, and for the last three or four days he suffered under the symptoms of acute pericarditis, by which he was carried off.

Post mortem.—The sac was the size of two fists laid together. It communicated with the arch of the aorta, by an opening which corresponded to the orifice of the innominata, enlarged to about twice its natural size. The internal jugular veins of both sides, near their junction, with the subclavian veins, were completely closed by adhesion of their coats. The subclavian veins were only obliterated at the point where they were joined by the jugulars. Both brachio-cephalic veins, besides having their canals closed at their commencement, were entirely obliterated where they unite to form the vena cava superior, and lost in the parietes of the sac. A part of the right thoracic duct, about three inches in length, was obstructed at its termination, and ended in the closed brachio-cephalic vein. The great thoracic duct had been injected in the abdomen previously to the dissection, and was traced along the posterior mediastinum as far as the tumour, where it became so much involved in the dense textures situated there, that it was lost sight of. In this extent, its appearance did not present any thing preternatural. The glands of the neck were so enlarged, that they occasioned a perceptible fulness in the lower part of the neck during life. The glands of the axilla, groin, and mesentery were also enlarged. A layer of reticulated lymph was found on the surface of the heart, and the pericardium contained a quantity of reddish brown fluid.

No. 16.—A man, aged 44, admitted to the Middlesex Hospital, September 1, 1851, under Dr. Wilson's care, stated that he had been ill for two months, but had not been entirely free from pain for the last thirteen years. While in hospital he suffered from dyspnœa, and he could only speak hoarsely in a whisper; there was also some difficulty in swallowing; veins of the face and neck turgid: the head, neck, and superior extremities became greatly œdematous, while the lower parts of the body were quite free from it. *Post mortem.*—The aneurism arose from the innominata midway between its origin and its bifurcation, and measured in its greatest length (which was in the direction upwards), very nearly five inches, and in its transverse about three inches and a half; it was filled to four-

fifths of its extent with concentric layers of fibrine, which gave to the whole tumour a hard and solid feel. It reached upwards along the trachea, so as to overlay the lower part of the thyroid gland; and had partly absorbed the right clavicle and the upper part of the sternum. The openings of the carotid and subclavian were not in the least enlarged, neither was the opening from the aorta into the innominata. The right subclavian, internal jugular, and brachio-cephalicveins were obstructed by fibrine; the latter vessel wound round the lower part of the tumour in front, and was diminished to the size of a crow-quill. Some fluid in the pericardium; heart healthy; ascending aorta very considerably dilated, and atheromatous deposit on it.

No. 17. Mr. KEY's Case, *London Medical Gazette*, 1844, page 334.—Mr. Key attempted to pass a ligature round the innominata, but had to desist on account of a tumour attached to that vessel. The patient died on the twenty-third day after. Dr. Hughes had given it as his opinion, that the innominata was engaged in the disease, while the other physicians considered the arch and the innominata to be healthy. *Post mortem*.—The tumour which prevented the completion of the operation was an aneurism of the upper part of the innominata, including the origin of the subclavian; the carotid being comparatively healthy. The sac, together with a mass of diseased glands, pressed on the right bronchus, and had by its pressure been the immediate occasion of the fatal termination.

No. 18. Mr. GREENHOW's Case, *London Medical Gazette*, 1851, vol. xviii. p. 726.—A sailor, middle-aged, admitted to the Newcastle Infirmary, presenting a pulsating tumour at the right side of the neck, each pulsation throwing the shoulder forwards, as if it formed part of the parietes of the tumour. The sounds of the heart were heard very distinctly in the tumour, and a deep, faint *soufflet* heard most audibly at the scapula. *Post mortem*.—The innominata was dilated and diseased at its origin from the aorta, as well as where it expanded into the immense aneurismal sac, which extended on the right side from near the ramus of the jaw down to the third rib. A cast of the tumour had been taken, which showed it to measure eleven inches from side to side, while it projected three inches from the neck. The clavicle and two superior ribs were completely corroded and divided into two parts.

No. 19. DR. STOKES' Case, *Dublin Medical Journal*, First Series, vol. v. p. 406.—A shoemaker, aged 34, muscular development, admitted into the Meath Hospital, December 29, labouring under cough, difficulty of breathing, with pain in the chest, head, and neck. The night after admission he was attacked with hemiplegia of the left side. He had in general enjoyed good health, although subject to attacks of shortness of breath (particularly after any effort), with numbness of the right arm. Left side almost totally deprived of sensation and motion, while the mouth was drawn to the right side, and the tongue protruded to the left. Complains of violent pain in the right side and back part of the head and neck; difficulty of swallowing; cough

of a laryngeal character, with pain in the chest. Pulse 84, full in the left wrist, but exceedingly indistinct in the right, nor could any pulsation be detected in the brachial or axillary artery on that side. Decided dulness at the sternal extremity of the right clavicle. Respiration in the left lung intensely puerile, but exceedingly feeble in the right. On applying the stethoscope to the sternal extremity of the right clavicle a very loud double pulsation was discovered, with a strong impulse, but diminishing in intensity as the heart was approached; the sounds and impulse of which were natural. No *bruit de soufflet* could be detected in any part of the chest. On pressing the fingers behind the right clavicle, a small pulsating tumour could be felt in the direction of the arteria innominata. On the 25th January the tumour extended about an inch above the clavicle, was bounded internally by the mesial line, and externally by the posterior border of the sterno-mastoid; yet the dysphagia had diminished, notwithstanding the increase in size of the tumour. The superficial veins of the head and neck, particularly on the right side were greatly engorged. The size of the sac increasing, the right side, of the face, as well as the paralytic arm, became œdematous, while the right arm and lower extremities continued free from œdema; the trachea was pushed far to the left side, so that the larynx corresponded to a line drawn from the middle third of the left clavicle: intense bronchitis in the left lung. *Post mortem.*—An abscess, containing about an ounce of purulent fluid, was found in the middle of the right hemisphere of the brain. The size of the external tumour had much diminished; the larynx, trachea, and œsophagus, which, previously to death, were nearly in a line with the middle third of the left clavicle, were now more in a line with its sternal extremity. The aneurism was of the arteria innominata, and occupied the entire of the anterior wall of the vessel; it arose at first narrow (two inches in circumference), then increased to the bulk of a large cocoa-nut. The right side of the trachea was so flattened as almost to prevent the passage of air; the right carotid and jugular vein, on the posterior surface of the sac, were flattened and obliterated; the right and left venæ innominatæ were flattened and completely obstructed on the anterior surface of the tumour. The left carotid and subclavian arteries were unaffected; but the right subclavian was pressed so flat at its immediate origin that no blood could have passed from the innominata, though there appeared to have been a reflex current by anastomosis, as the artery was gaping immediately after its origin, and quite healthy; the aorta was found somewhat dilated and its coats thickened; the vagus nerve was also flattened. The apex of the lung was much compressed.

No. 20. Dr. STOKES' *Second Case*, *Dublin Medical Journal*, First Series, vol. xv. page 303.—In the case from which the preparation (which was laid before the Dublin Pathological Society) was taken, there had not been any dislocation of the clavicle; an aneurism of the arteria innominata had displaced the trachea, and folded it upon itself. The voice was of quite a different character from that heard

in true laryngeal disease; its tone being scarcely the same for two days, varying from the deepest bass to a shrill treble, or becoming almost extinct.

No. 21. Dr. HUTTON's Case, *Dublin Medical Journal*, First Series, vol. xxv. page 499.—A man, aged 47, enjoyed good health up to March, 1841, when he was attacked by pain in the right shoulder and clavicle, which gradually extended up that side of the neck to the ear and head; a dry cough began in June, to which succeeded difficulty of swallowing. In November his strength failed, and there was perceived a small pulsating tumour under the sterno-mastoid muscle; on his admission to the Richmond Hospital, in April, 1842, the tumour was situated a little to the outside of the sternal attachment of the sterno-mastoid; there was no *bruit de soufflet*; the right radial pulse was somewhat less than that at the opposite wrist; he suffered from bronchial cough and dyspnœa, but the dysphagia had become less as the tumour had risen above the sternum.

After his admission the pulse became smaller; the tumour increased in size, passing across the middle of the neck, its diameter across the neck being two inches, and from above downwards only an inch and a half. The right carotid was tied June 27; for several days the size of the tumour gradually diminished, and the dyspnœa became less, until, on the twenty-second day after the operation, when hemorrhage occurred from the wound, and this returned; on the thirty-eighth day he had rigors and convulsive motions resembling epilepsy; these recurred on the forty-first. On the following day the tumour had increased in size, pulsated more strongly, and the sputa were bloody. A sudden enlargement of the tumour occurred on the sixty-fifth day, accompanied by syncope. He died the seventy-sixth day from the operation.

Post mortem.—There had not been any attempt at union in the artery, it had ulcerated through where the ligature was applied; above this point there was atheromatous deposition in the vessel. The aneurismal tumour of the innominata (containing purulent matter and grumous blood) projected into the trachea, blood passing into the air-tube through a very small opening; the aorta was not dilated, but had some atheromatous points on it; the left vertebral artery came off from the arch of the aorta; the left subclavian was healthy. A large conical coagulum, of an inch long, filled the right carotid; a coagulum existed in the right subclavian, evidently older than that in the carotid.

No. 22. Mr. WICKHAM's Case, *Medico-Chirurgical Transactions*, vol. xxii. p. 405.—A sailor, aged 55, admitted to the Winchester Hospital, September 17, 1839. Six months ago he observed a swelling, the size of a hazel-nut, above the middle of the right clavicle, without pulsation or pain; it disappeared in about eight days, and re-appeared four weeks before his entering the hospital, presenting itself just above the sternal end of the clavicle. On his admission, the swelling had attained the size of a hen's egg; it seemed that the tumour extended over the carotid artery at its lower

part, and reached as high as the transit of the omohyoid muscle; it inclined also somewhat towards the subclavian artery, had all the characteristics of aneurism, and that of the innominata; his health was injured by continued pain and difficulty of breathing. Sir A. Cooper confirmed the diagnosis, that the disease was of the innominata, and sanctioned the tying of the carotid and subclavian. On the 25th September the carotid artery was tied immediately above the omohyoid muscle; the pulsation in the tumour continued, but with less force; the trachea was almost immediately relieved from pressure by the reduced size of the tumour, the troublesome cough and dyspnoea being thereby considerably lessened. Before he submitted to the second operation his appearance was very wretched, difficulty of respiration extreme, cough very frequent, deglutition much impeded, and the tumour more than double its original size. The subclavian was tied December 3rd, the ligature came away on the 25th; he left the hospital on the 5th February; hemorrhage occurred on the 15th of the same month, and death from another bleeding on the 16th.

Post mortem.—Heart large, and loaded with fat. Pulmonary artery and superior cava greatly enlarged, the entire of the thoracic aorta greatly dilated; nearly half of the innominata occupied by the origin of the aneurism; clavicle and sternum partly absorbed, and the former dislocated; right subclavian artery obliterated from the clavicle to the first rib; right carotid obliterated from just above the upper edge of the omohyoid. The aneurismal sac reached as high as the upper part of the thyroid cartilage, and had burst upon its left side, though it projected most upon the right.

No. 23. Mr. LAWRENCE'S *Case, Medico-Chirurgical Transactions*, 1815, vol. vi. p. 227.—A woman, under 20, admitted to St. Bartholomew's Hospital, having been a fortnight ill, her only complaint being, a great difficulty of drawing air into the chest, amounting to a sense of suffocation, coming on in paroxysms, in the intervals of which she was free from all complaint. She died asphyxiated on the night after her admission.

Post mortem.—An aneurism of the innominata was found situated behind the first bone of the sternum, and pressing on the trachea so as to render it convex on its inner surface, but diminishing its caliber in a very slight degree. All the other organs were healthy.

No. 24. BURNS' *Surgical Anatomy of the Head and Neck*, p. 62.—An officer, who had seen much laborious service (having risen from the ranks), complained of numbness of the left arm, and an unpleasant sensation in his head; he was suddenly seized with acute pain over the first rib on the right side, and a tumour was found beneath the clavicular portion of the sterno-mastoid muscle, but nearer the acromion than the muscle; it pulsated strongly: the right radial pulse was weaker than the left, the right common carotid was also feebler than the left. In December, 1809 (two months after the above report), the tumour was much flattened; a peculiar thrilling

sensation was felt along the subclavian, vertebral, and common carotid arteries; frequent paroxysms of pain along the right side of the head, and constant numbness of the left hand. Towards the end of January, 1810, the right hand became slightly œdematous, and slowly lost power, assuming a permanently purplish colour. Aneurism of the subclavian was diagnosed. On the 22nd March the tumour suddenly increased greatly in size, extending laterally outwards, the clavicle was forced away from the sternum; there was no actual difficulty in breathing, but the patient said he "was short-winded;" voice becoming gradually impaired; the tumour still increasing in size, particularly towards the left side; he began to suffer from the dysphagia; voice raucous; pains extended to the left shoulder; and on the 10th October (four days before his death), his face was œdematous, streaked with purple veins, and lower limbs anasarcous; voice lowered to a whisper; still, difficulty of breathing and want of sleep were the chief subjects of his complaints, together with a hollow cough.

Post mortem.—The aneurism arose from the aorta, including a considerable part of the innominata, having in its ascent pushed the descending vena cava to the right, and the trachea to the left, pressing the right subclavian and the carotid against the spine. The trachea was so much displaced that the left carotid slanted across its front to reach the side of the neck. Left ventricle hypertrophied, aortic valves ossified. The arch of the aorta was dilated, and the œsophagus pushed completely from behind the trachea. (From the two plates that accompany this case it was evidently a good example of aneurism of the innominata).

No. 25. Mr. PATTISON's *Case*, BURNS' *Surgical Anatomy of the Head and Neck*, page 427. (This case forms the first note in the Appendix.)—Mr. J. M'C., enjoying excellent health up to the autumn of 1816, when he was attacked with what his medical attendants considered as rheumatic pains in the lower part of the neck, which was repeatedly examined without any thing being discovered, and the opinion of the rheumatic nature of the pains was held up to his death. Having gone to bed in his usual state of health, he was found next morning insensible from an apoplectic seizure; he rallied by the evening of the same day, and conversed with his friends, but coma soon returned. *Post mortem*.—General and very great turgescence was the only inorbid appearance found on examining the brain. The aneurism of the innominata pressed against the inferior surface of the sternum so as to render it carious. The left vena innominata was contracted, filled with lymph, and its cavity completely obliterated where it crossed the tumour, which was four inches in diameter by three in length, completely concealing the trachea and gullet. The superior and inferior thyroid veins were enlarged and distended with blood, through them the venous blood from the left arm and left side of the head and neck appeared to be conveyed to the right auricle; though this tumour, situated immediately in front of the trachea and

gullet, had so compressed the sternum as to render it carious, and had obliterated the transverse vein, still, neither dyspnœa nor dysphagia had ever been complained of.

No. 26. Mr. BAYFORD's Case, *Medical Observations and Inquiries for 1769*, page 14.—The symptoms that are briefly mentioned in the report of this case refer to an aneurism of the abdominal aorta, which was found, on the *post mortem* examination, to have ruptured into the cavity of the abdomen, and “at the upper part of the thorax a small aneurismal tumour was formed by a dilatation of the common trunk of the right subclavian and carotid arteries.” (This paper is accompanied by an engraving of the morbid appearances.)

No. 27. Dr. MOTT's Case, *American Journal of Medical Science*, 1830, February.—A man, aged 51, presented a pulsating tumour above the sternum, under the insertion of the right sterno-mastoid muscle, and extending within the chest as low as the second rib; pressure on the tumour almost completely interrupted his respiration; the least exercise had the same effect, and even when at rest his breathing had a wheezing character; he complained of pain when the tumour was pressed; œdema and numbness of the right arm; no pulsations could be felt in the right radial artery, and the right carotid pulsated much feebler than the left; on applying the stethoscope a *bruit de soufflet* was heard over the tumour. The primitive carotid was tied September 20, 1819; the second day after operation, the right radial artery could be distinctly felt pulsating, but it was totally absent in the same vessel twenty-four days after. *Post mortem*.—Aneurism of the innominata engaging the root of the carotid and subclavian arteries; clavicle partly dislocated and absorbed. Death had been caused by the pressure of the sac on the trachea, this tube having been found quite flattened.

No. 28. Dr. MORISSON's Case, *American Journal of Medical Science*, 1837, February.—A Spaniard, aged 42, had been confined to bed for nine months with pain in the cardiac region; dyspnœa increased by walking; rheumatic pains of the right shoulder, and in the muscles of the neck on the same side. A large pulsating tumour extended from within the chest upwards, and obliquely outwards, behind the sternal attachment of the right sterno-mastoid muscle. The tumour did not diminish perceptibly when pressure was made on the carotid above it, but the pulse at the right wrist became fuller and stronger; when pressure was made on the right subclavian, the tumour pulsated more strongly, as likewise did the temporal and facial arteries of the right side. From these phenomena it was concluded that the aneurism was of the root of the right carotid and innominata. The carotid was tied November 5, 1832. The pulsations of the tumour (which were most violent for seven days after the operation) became weaker, its size diminished, and his health was re-established; he died suddenly twenty months after the operation. *Post mortem*.—Nothing in the chest to account for death; the aneurism was of the innominata and root of the carotid; it had not ruptured;

the arch of the aorta was dilated and had calcareous deposit on it; head and abdomen not examined.

No. 29. M. GENEST's *Case*, *Archives Générales de Médecine*, vol. xxvi. 1831, page 205.—A Portuguese under-officer, aged 44, admitted into the Hôtel Dieu, March 31, 1831. Refers the origin of his illness to a violent effort made with the right side of his body, in an attempt to move a piece of cannon. This occurred two years before his admission; almost immediately after, he found a difficulty in swallowing, and six weeks had scarcely elapsed before the right arm became paralysed. Six months after this violent exertion, a tumour appeared in the space between the trapezius and sterno-mastoid muscles; on admission, a tumour extended from the right clavicle just to the chin, from which a deep furrow separated it; it pulsated synchronously with the pulse, and was as large as an adult's head; his answers were short, and he was obliged to stop suddenly in his conversation if he became excited. A tumour compressed the trachea; respiration was accompanied by a hissing sound and paroxysms of dyspnœa. The right pulse was the weakest, seeming to indicate that the principal vessel of the limb was implicated; a gangrenous eschar formed at the apex of the tumour, and he died from one burst of hemorrhage. *Post mortem*.—An aneurismal tumour of the innominata adhered closely to the first rib, to the right clavicle, to the upper part of the sternum, to the sternal extremity of the left clavicle, and to part of the first rib on the left side. The carotid and subclavian were not in the least dilated; the common carotid was behind the tumour and intact; the subclavian did not appear compressed. The trachea, larynx, and œsophagus all very much compressed from the right side; the wall of the sac was deficient anteriorly; the sterno-mastoid muscle was in contact with the blood of the tumour, and formed its anterior wall.

No. 30. M. MICHON's *Case*, *Gazette des Hôpitaux*, 1847, p. 527.—Patient could give no account of when the disease began; when seen for the first time in February, he could not sit up in bed without danger of suffocation. Above the sternum, and a little to the right of the medial line of the sterno-mastoid, a deep tumour was felt pulsating feebly. Right radial pulse was very small as compared to that in the left arm. Respiration and voice short; now and again, without any perceptible cause, a sudden access of suffocation comes on. In the July following he could sit up in bed, even walk slowly in the ward, and it seemed as if the tumour had in part disappeared, but the larynx was pushed over to the left side. A *bruit de soufflet*, extending into the right carotid, was heard on applying the ear to the chest. Later in the case, respiration could scarcely be heard: skin cold, lips violet, veins of the neck swollen; voice almost inaudible, as if there was some obstacle in the throat; slight cough, but neither hemiplegia, dysphagia, or hemoptysis. Percussion gave a much less clear sound on the right than on the left side, on a level with the sterno-clavicular articulation.

Post mortem.—A tumour, the size of a fist, was developed at the root of the brachio-cephalic trunk (the innominata). The recurrent nerve on the right side, in passing under the tumour, was thereby compressed, and divided into many branches, which were applied closely to the sac. The trachea was pushed to the left side without being sensibly flattened. The bronchi were not in contact with the tumour.

No. 31. M. BRESCHET's Case, *Mémoires de l'Académie de Médecine de Paris*, vol. iii. p. 129.—Patient, aged 40, admitted to the Hôtel Dieu, May 28, 1829; had been a soldier for ten years, and presented on the right side an aneurismal tumour of the subclavian, extending from the brachio-cephalic trunk to below the clavicle; the right arm was not wasted, still he complained of its being weak, and occasionally swelling. Dupuytren tied the axillary artery; death occurred from repeated hemorrhages.

Post mortem.—The innominata presented an enormous dilatation in all its circumference; the aorta, just to its passage between the pillars of the diaphragm, was considerably enlarged; an aneurismal tumour extended from the division of the innominata to a little above the point where the ligature had been applied.

No. 32. M. BOINET's Case, *Bulletin de la Société Anatomique de Paris*, for 1836, p. 47.—A Chandler, aged 57, admitted to the Hôpital Necker, May, 1834. The only position he could remain in for any length of time was sitting up in bed, arms carried forwards, head flexed on the chest; the respiration was difficult, expiration sibilant, and voice feeble. A tumour, pulsating synchronously with the pulse, extends from the superior border of the sixth rib to the thyroid cartilage, and transversely outwards to the middle of the right clavicle, the sternal end of this bone being dislocated; veins on and about the tumour dilated; trachea was compressed and dislocated to the left side, so as to be on a line with the left sterno-clavicular articulation. Right carotid pulsates more feebly than the left; pulses at the wrist equal; pain in the head; he gets violent fits of coughing, during which the face becomes violet-coloured, and he loses consciousness. Percussion gives a clear sound on both sides of the chest, except at the superior part; a *bruit de soufflet* is heard over the tumour; no abnormal sound on the left side of the chest; on the right slight œgophony, as high as the first dorsal vertebra. M. Langier (under whose care this patient was) diagnosed aneurism of the right subclavian, probably extending to the innominata, and on the 12th June, the axillary artery was tied. Hemorrhage began on the 17th; the volume of the tumour diminished a third, and the trachea returned to the mesial line, thus resuming its natural position, while the cutaneous veins became less apparent, the cough becoming less frequent; still the hemorrhage continued; the size of the tumour diminishing daily, until, on the 11th July, it was but half its original bulk; as the size of the tumour diminished, the respiration became more and more difficult, and on the 12th July he died asphyxiated.

Post mortem.—Upper part of sternum, end of clavicle, and the three superior ribs on the right side, were eroded and in part destroyed. The tumour springing from the innominata was as large as a child's head, it compressed the carotid, trachea, bronchi, and œsophagus; the second and third dorsal vertebræ were denuded and in part destroyed; the sac was deficient where the tumour met the vertebræ, the clots being in direct contact with these bones; numerous strong adhesions existed, and prevented all effusion into the pleural cavities. The œsophagus was perforated opposite where the vertebræ were corroded; an opening also existed in the larynx, just below the vocal chords. Half-an-inch below the cricoid cartilage, the trachea was so much compressed as to have become triangular, the apex being posteriorly; the right carotid and subclavian had their origins on the surface of the tumour. The right pulmonary artery and veins were compressed; heart hypertrophied, aortic valves insufficient.

No. 33. M. MAZET's Case, *Bulletin de la Société Anatomique de Paris*, 1838, page 49.—A woman, aged 47, admitted to the Hôtel Dieu, May 1, 1838, complaining of dyspnœa and cough with expectoration; mucous and sonorous râles were heard over the chest; heart pulsating with force, but without abnormal sound; the *right* pulse could not be felt even as high as the brachial, and in continuing the search for pulsation higher up, a tumour was found behind the sterno-mastoid muscle, extending behind the sternum into the chest, pulsating synchronously with the pulse, and not painful on pressure. A sound analogous to the first sound of the heart was heard under the right clavicle; no pulsation in the right common carotid; aneurism, probably, of the brachio-cephalic artery was diagnosed; the tumour did not appear to have increased in size since its appearance four years before. She died May 13.

Post mortem.—Softened tubercles in both lungs; a pyriform tumour, four inches long by eight inches in circumference at its largest point, occupied the place of the innominata; the subclavian vein in front of this tumour had been thereby made to form an arch, the concavity looking upwards; the trachea was displaced a little to the left, besides being compressed to the extent of about an inch; the tumour adhered to the first rib and to its sterno-clavicular articulation; the right carotid and subclavian arose from its posterior surface; the right common carotid was impermeable for two and a half inches from the sac; the subclavian was only obstructed at its origin; no dilatation of the aorta.

No. 34. M. L'HOMMEAU's Case, *Bulletin de la Société Anatomique*, 1840, p. 212.—A man, aged 40, complained of intense pain in the right side of his neck and corresponding arm, seven weeks after he had fallen heavily from his horse. Having suffered from dyspnœa during the night, he applied for relief, and on examination, sonorous and sibilant râles were heard all over the chest. The day after his admission there suddenly appeared in the neck a round, pulsating tumour, which caused a painful sensation in the course of the œso-

phagus. On a level with the top of the sternum double pulsation was heard; left arm cold and blue; no pulsation in the left radial or humeral arteries. The state of the right arm and right radial pulse was normal. M. le Docteur Berard diagnosed an old aneurismal dilatation of the transverse aorta, or of one of the trunks originating from it; rupture of the old sac, without hemorrhage, causing the sudden appearance of the tumour, and the state of the left arm caused by a clot in the subclavian artery. Death occurred during a paroxysm of dyspnœa.

Post mortem.—Dilatation of the brachio-cephalic trunk, the left subclavian obliterated by a clot of recent origin. The relations of the tumour rendered an exact explanation of the pain in the course of the œsophagus, of the dyspnœa, and of the sibilant character of the respiration. [This is all that is said regarding the position of the tumour.] The left common carotid arose from the arch by two distinct branches united by a band of areolar tissue and soon forming one trunk.

No. 35. M. CHAPELLE'S Case, *Bulletin de la Société Anatomique*, 1848, p. 291.—A carpenter, aged 46 (a drunkard), complained of pain in the right shoulder in July, 1843, followed in November by the appearance of a tumour. When admitted to the Hôpital St. Antoine, under M. Malgaigne, the tumour, as large as a hen's egg, pulsated in all its parts, having its base covered by the sternum and the internal border of the right clavicle. M. Malgaigne intended tying the subclavian and carotid arteries, but only tied the latter vessel, the patient being too much exhausted to justify a second operation, as the carotid, being far to the external border of the sternomastoid, had rendered the operation very tedious; tumour diminished very much in size, and he left the hospital much relieved, but against M. Malgaigne's advice. On the 30th July he was admitted to the Hôpital St. Louis, at which time the tumour was larger than before the first operation; a prolonged impulse was heard over the tumour, followed by a period of repose, to which succeeded a *bruit*, clear, short, and replaced immediately by the long impulsive sound; the length of the impulsive sound, and the absence of any pause after the second sound, prevented the movement and *bruit* of the aneurism from being synchronous with the heart sounds. The circulation was re-established at the right side of the head; right pulse smaller than the left; he spoke a little hoarse, had some slight difficulty in swallowing; pain in the right shoulder and arm, at times very intense; slept on the left side, the pain and difficulty of breathing being increased in any other position, and he complained of a pricking sensation in his eyes. M. Malgaigne tied the subclavian on the 13th October, just seven months after the first operation. On the 5th of November dyspnœa re-appeared; on the following day the dyspnœa had increased in intensity, though the tumour was less apparent; he died asphyxiated on the following day.

Post mortem.—The sac occupied the termination of the innominata, engaging the primitive carotid and subclavian. The carotid

was completely obliterated on a level with the superior part of the larynx; the subclavian was pervious, except where the ligature had been applied. The innominata was an inch and three-quarters in diameter, and the walls of the part that formed the sac were much thickened. The upper part of the sternum, first rib, and clavicle, were eroded from the pressure of the sac.

No. 36. Sir D. DICKSON's *Case*, *Revue Médicale*, vol. ii., for 1837, p. 111.—A sailor, aged 40, admitted to the Marine Hospital, Plymouth, in April, 1835, for continual cough, with viscid, sometimes muco-purulent expectoration, and a feeling of constriction, more than pain, at the upper part of the sternum. Pulse irregular, respiration laborious, with mucous and sonorous râles over the chest; he suffered from paroxysms of dyspnœa, of an asthmatic character. Chronic bronchitis, with hypertrophy of the heart, was diagnosed; and at a later period there was thought to be a tumour compressing the trachea. He died asphyxiated, June, 1836.

Post mortem.—An aneurism, the size of an orange, engaging the centre of the innominata, had obliterated the left subclavian vein, and the blood could but with difficulty pass through the right subclavian vein, hence the distention of the vessels of the head and neck; the trachea was compressed, and adhered to the tumour; there was also general dilatation of the thoracic aorta. [I have searched in vain for any notice of this case in the English medical journals.]

No. 37. M. DUBRUEIL's *Case*, *Sur les Anévrysmes de la Portion Ascendante et de la Crosse de l'Aorte*, p. 90.—A man, aged 37, admitted to the Hôpital St. Eloi de Montpellier, the symptoms being, pain, intense and continued in the upper part of the chest, low down in the neck and right shoulder; respiration sibilant; frequent cough; voice weak and cavernous; right pulse scarcely to be felt; right humeral artery pulsating very feebly. A pulsating tumour existed above the right sterno-clavicular articulation, and extended across the neck to the sternal attachment of the left sterno-mastoid; a second tumour rose above that just described, as high as the fifth cervical vertebra; a *bruit de râpe* was heard over it; while an obscure *bruit de soufflet* was heard over the chest, there being no difficulty in distinguishing the pulsations of the tumour from those of the heart. Aneurism of the arch of the aorta and innominata was diagnosed. The tumour, as it increased in size, dislocated the clavicle, pushed the sternum forwards, rendered the dyspnœa more and more intense; blood was discharged by the mouth, and he died soon after.

Post mortem.—Remarkable flattening of the tumours; an aneurism arose from the superior and posterior of the transverse part of the arch, inclining to the right, resting on the trachea, into which it had burst. The innominata was dilated to double its normal size, its caliber was almost entirely obstructed by a mass of solid fibrine of a very ancient date, which scarcely allowed any blood to pass through it.

No. 38. M. DUBRUEIL's *Case*, *Sur les Anévrysmes de la Portion Ascendante et de la Crosse de l'Aorte*, p. 122.—A captain of artillery, aged 44, was attacked with pain in the upper part of the chest, for which he took warm baths; hæmoptysis appeared, and continued at intervals; attacks of dyspnœa became so urgent as to oblige him to

enter the Hospital at Montpellier on the 6th August, 1836; bleeding relieved the intense dyspnœa but little, and he died suffocated; lesion of the vessels not being suspected, though the lungs were frequently examined.

Post mortem.—Interlobular emphysema: an aneurism of the brachio-cephalic trunk was found, as large as a turkey's egg, having perforated the trachea at three points; some spiculæ of phosphate of lime had passed from the walls of the sac into the trachea, and raising the mucous membrane about two inches from the origin of the bronchi, appeared (when seen from the trachea), as raised reddish tumours under the mucous membrane.

[This case was reported to M. Dubrueil.]

No. 39. M. DUBRUEIL's Case, *Sur les Anévrysmes de la Portion Ascendante et de la Crosse de l'Arte*, p. 129.—A man in the prime of life was seized suddenly with severe dyspnœa and violent convulsive cough, which he attributed to having a few moments before made a violent effort in raising a bag of corn; the dyspnœa continued, and he was obliged to leave his work. Six months after, a tumour, the size of a nut, was seen pulsating at the inner third of the right clavicle. The tumour had acquired an immense size, pressing outwards the lower half of the neck, and extending downwards into the chest, as low as the third rib; it passed transversely across the chest from the internal third of the right clavicle to the sternal insertion of the left sterno-mastoid; over the part of the tumour that was within the chest a *bruit de soufflet* was heard, so loud as to strike the ear, while over the portion that was external to the chest and above the clavicle a purring murmur existed, such as is heard in external aneurism. His respiration was loud and wheezing, voice raucous, the patient even aphonic at times; right arm infiltrated with serous effusion; right side of the face wasted; deglutition always painful and sometimes impossible; left pulse natural at 56; right thread-like. Pulsation can scarcely be felt in the right common carotid, and was absent in the temporal of that side; the fits of coughing, without expectoration, became more frequent and violent; the sac burst externally, and death was instantaneous. Aneurism of the innominata, connected with, and dependent upon aneurism of the transverse portion of the arch, had been diagnosed.

Post mortem.—The arch was found *perfectly* healthy, though the entire of the innominata was engaged in the aneurism; rupture had occurred at the highest point; a coagulum rendered the right common carotid completely impermeable; the subclavian was also considerably diminished in size; not far from the cricoid cartilage the tumour rested on the trachea, thereby causing flattening and thinning of four of its rings.

No. 40. M. PLANQUE's Case, *Bibliothèque Choisi de Médecine*, 1759, vol. x. p. 276.—A soldier, aged 46, admitted to the Infirmary of the Hôtel des Invalides, complaining of cough, with bloody expectoration and pain in the throat, these symptoms having existed for the past six weeks. A tumour was found at the anterior and inferior part of the neck, immediately above the sternum, pulsating regularly, and capable of being emptied, but immediately refilling

on removing the pressure; he only noticed it since he was attacked with a cold six weeks ago; he discharged blood by the mouth on the third day after admission, and died.

Post mortem.—A pouch, one inch in diameter by two in length, was given off from the innominata at its middle, having the form of the tumour that appeared in the neck; hence, says the author, “the aneurism was not of the aorta, as I had considered it to be.”

No. 41. M. PIORRY'S *Case*, *Traité de Médecine Pratique*, vol. i. p. 299.—“In a patient whose right subclavian space was occupied by an aneurismal tumour, examination after death showed it to have been caused by an aneurism of the innominata, and that the sac was of the dimensions indicated by percussion made before death.”

At page 390, vol. x. of the *Journal de Médecine* par M. Sédillot, there is an account of an aneurism of the aorta that extended to the innominata. There is also reported, at page 306, vol. xi., *Recueil des Mémoires de Médecine, de Chirurgie, et de Pharmacie Militaires*, a case of extreme dilatation of the aorta, innominata, carotid, and subclavian arteries; but sufficient details are not given to secure for these cases even a pathological interest.

No. 42.—In the *Bolletino delle Scienze Mediche*, and in the *Journal des Connaissances Médico-Chirurgicales*, vol. ii., for 1844, page 78, it is mentioned, that M. Rossi tied the right subclavian and primitive carotid, and that *post mortem* examination showed the innominata to be the seat of an aneurism; the left carotid and right vertebral arteries were found obliterated; hence, for the six days that he lived, after the subclavian and carotid had been tied, the left vertebral was the only artery through which blood could pass to the brain.

No. 43. *Repertorium der gesammten deutschen Medizinisch-Chirurgisch Journalistik*, by Neumeister, for 1830, p. 119.—A man, aged 41, of good constitution, was sent to the hospital, for the disease above mentioned (aneurism of the innominata). The tumour was too extensive (beating with great violence) to admit of a ligature being applied, after Hunter's method, between the sac and the heart; Brasdor and Wardrop's operation being the only one applicable to this case, the carotid artery was tied; an hour after he complained of intense headach, and the tumour pulsated as violently as before. On the following day, June 14, the pulsations were not so strong, and the pain in the right shoulder and arm was much less. June 16th, partial loss of vision in the right eye, pain in the right ear, mind began to wander, paralysis of the left side of the body appeared, which increased on the next day, and death followed on the 18th.

Post mortem.—An aneurism of the innominata, the size of a man's fist, was found, which had rendered the right clavicle carious; the carotid was obstructed by a firm coagulum, for the extent of an inch and a half below where the ligature had been applied.

No. 44. DR. HAMPEIS' *Case*, *Medecinische Jahrbücher des Kaiserliche Königl. Oesterreichischen Staats*, January, 1845, p. 19.—A man, aged 62, observed a swelling rising between the second and third ribs, on the right side; it was not painful, and disappeared on pressure; it increased rapidly, and on his admission to hospital was five inches in diameter, by two in height; it spread over the ster-

num; the veins on the right side of the chest were varicose; feeling of cold extending down the right arm; burning pain in the throat; cough, with bloody expectoration; the entire mass pulsated strongly; heart's action irregular; he suffered from occasional fainting fits and difficulty in swallowing; the tumour was daily expected to burst externally; he died on the 22nd April.

Post mortem.—An enormous aneurism of the innominata was found, having by its pressure caused absorption of the upper part of the sternum at the right side; the superior ribs on the same side were in part absorbed.

No. 45. PROFESSOR DE RENZI's Case, *Annali Universali di Medicina, Omodei*, 1836, vol. lxxviii.—A earrier, aged 46, admitted to the Hospital for Incurables; addicted to the use of spirituous liquors; and had suffered from syphilitic bubo. In September, 1832, he was attacked with pain in the right clavicular region, an irritating cough, and loss of sensibility of the right arm; respiration became difficult, and the cough took on a convulsive character. Later in the case, he is reported to have complained of a vague pain in the throat, slight aphonia, difficulty in swallowing, and impossibility of lying on the back; left radial pulse beat very quick, while no pulsation could be felt in the right radial, brachial, or carotid arteries. As the disease progressed, pain extended to the left side and shoulder, followed by numbness of the corresponding arm; mucus accumulated in the trachea, which was expelled with so much difficulty as at times to threaten suffocation. The rhythm of the heart was not quite natural; the entire chest sounded dull on percussion; pectoriloquism was heard over the inferior part of the right lung, anteriorly; sibilant respiration in the lower part of the left, together with other phenomena, that led to the diagnosis of tubercular disease, with the formation of a cavity, and an affection of the heart. The absence of pulsation in the right radial, brachial, and carotid arteries led to the suspicion of disease in the great vessels; but it could not be stated positively, for want of the necessary signs.

Post mortem.—The lungs were full of miliary tubercles, and presented a cavity in the inferior lobe of the right lung. The aortic valves were a little thickened and indurated. An aneurismal tumour, the size of a small orange, arose from the innominata, and in part from the aorta; it was filled by a mass of very adherent fibrine, extending into the carotid. The sac lay to the right side of the trachea, and an inch above the division of the bronchi.

No. 46. *Wardrop on Aneurism*, page 104.—A man, aged 30, was seized with violent vomiting, during which a swelling suddenly started up in the hollow of his neck; a fortnight after he complained of pain in the right arm and side of the head. An aneurismal tumour occupied the space between the clavicular portion of the sterno-mastoid muscle and the edge of the trapezius, extending downwards and inwards behind the right clavicle; the sac increased rapidly, and respiration became impeded. *Post Mortem.*—The tumour had diminished in size, and arose from the innominata; one of its divisions extended upwards by the side of the trachea, as high as the cricoid cartilage; a second lobe stretched along the clavicle to one-third the length of the bone; and a third passed upwards and outwards, be-

tween these two, to the anterior edge of the trapezius, while the entire sac rested on the arch. The carotid was obstructed to the extent of half an inch, and a membrane stretched across the opening of this vessel into the innominata.

It is unnecessary to lengthen further this part of the subject by giving an account of the preparations of innominata aneurisms in British and Foreign museums; for, as the phenomena they produced during life are not recorded, their value is purely pathological; I would therefore refer those who take an interest in these inquiries to the catalogues of these museums.

DIAGNOSIS OF INNOMINATAL FROM AORTIC ANEURISMS.

With what disease is aneurism of the innominata most liable to be confounded? Doubtless, with aneurism of the transverse portion of the arch of the aorta; and it is by contrasting the symptoms and signs of the two affections that I shall endeavour to arrive at their differential diagnosis.

In order to make this comparison, the twenty-four most accurately reported cases (in which *post mortem* examinations were made) have been placed in a tabular form, drawn up in a manner nearly similar to that in which have been recorded Dr. Greene's^a twelve cases of aneurism of the transverse portion of the arch, as his essay contains the most complete collection of aneurisms of that part of the vessel with which I am acquainted; and their having been recorded by so accurate an observer, with the intent of arriving at a knowledge of the symptoms and signs proper thereto, leaves nought to be desired save that he had lived to continue his researches. Unfortunately, the same reliance cannot be placed on the record of cases of innominatal aneurism, as some of them were complicated with disease of the adjacent vessels, and the phenomena they presented were not noted with the accuracy that is necessary for affording materials for statistical inductions, nor, moreover, is their number sufficient to stamp certainty on conclusions arrived at by their numerical comparison; I hope, nevertheless, to be thereby enabled to develop some of the elements of a diagnosis which clinical observation will, I trust, bring to perfection.

^a Dublin Quarterly Journal of Medical Science, New Series, vol. ii. p. 1.

No.	By whom Reported.	Sex.	Age.	Tumour and Impulse.	Dyspnœa.	Cough and Voice.	Dysphagia.	Pains.
1	Mr. Wardrop,	F.	45	A pulsating tumour at the inner side of the sterno-mastoid, its base being the upper part of the sternum.	Great difficulty of respiration at times.	.....	.....	Severe pain through the left side of the head and neck.
6	Dr. Whiting,	M.	40	.....	Constant dyspnœa, increased by exercise.	Harsh, crowing cough; mucous expectoration, streaked with blood.	Difficulty in swallowing solid food.	Intense pain from front of ear along right side of face and head.
7	Dr. Auchincloss,	M.	64	A pulsating tumour behind the right sterno-clavicular articulation, extending in the course of carotid and subclavian; finally it occupied the entire right side of neck, pushing larynx and trachea two inches to left.	Dyspnœa prevented sound sleep.	Frequent, dry, tickling cough, and hoarseness of voice.	.....	Numbness and shooting pains in right arm and in right shoulder.
8	Dr. Henderson,	F.	59	A pulsating tumour extended from the third right rib to two inches above sternal end of right clavicle, and outwards to an inch and quarter from the sterno-clavicular articulation.	Great difficulty of breathing.	Paroxysmal cough.	.....	.....
9	Dr. Campbell,	M.	48	A pulsating tumour appeared at both the tracheal and external side of the right sterno-mastoid, and within the chest, as low as cartilage of second rib.	.....	.....	.....	Pain in right shoulder, right side of head and neck.
10	Mr. Lyon,	M.	43	A pulsating tumour extended from the right side of thyroid gland to the sternum, and under the inferior portion of the sterno-mastoid muscles.	.....	.....	.....	Pain in back of neck and right shoulder.
11	Dr. Wishart,	M.	40	Over the upper part of the sternum a strong impulse can be felt, and a murmur is heard extending to the neck.	Great dyspnœa.	Suffocative cough; voice a whisper; hæmoptysis.	.....	.....
14	Mr. Shaw,	M.	50	The hollow below the right clavicle was filled up, and pulsated. Seven months after, a tumour rose above that bone. Sternal end of clavicle pushed forward.	Orthopnœa.	Dry cough; voice at first hoarse, afterwards a whisper.	Slight difficulty in swallowing.	Intense pain in right side of neck and right arm, which became numb and œdematous; finally, both sides so.
15	Mr. Shaw,	M.	33	No aneurismal tumour externally.	.....	.....	.....	.....
19	Dr. Stokes,	M.	34	At first a tumour could be felt deep behind the right clavicle, and finally rose above it. Trachea displaced so as to correspond to a line drawn from the middle third of the clavicle. Paraplegia of left side.	Dyspnœa.	Cough of a laryngeal character.	Difficulty in swallowing, diminishing as the external tumour increased.	Pain in chest, head, and neck, numbness of right arm; right side of face and left arm œdematous.
21	Dr. Hutton,	M.	47	Pulsating tumour to the outside of sternal attachment of right sterno-mastoid, afterwards it passed towards the middle of the neck.	Dyspnœa.	Dry cough.	Dysphagia less as the tumour rose above the sternum.	Pain in right shoulder and clavicle, extending up that side of neck and head.
24	Mr. Burns,	M.	..	A pulsating tumour beneath the clavicular portion of right sterno-mastoid; it suddenly increased in size, and dislocated the clavicle.	Difficulty of breathing.	Voice gradually became weaker; cough towards the end.	Dysphagia towards the close of life.	Pain in right side of head; pain and numbness of left arm; right œdematous, and lost power.

Heart, Arteries, and Veins.	Respiration.	Percussion.	Auscultation.	Post Mortem Appearances.
No pulsation in right carotid or its branches; vigorous in the left.	Respiratory sounds normal.	. . . . .	<i>Bruit de soufflet</i> under the clavicular edge of the sterno-mastoid.	Aneurism from the origin of the innominata to its bifurcation; aorta of natural size, calcareous deposit on it; right carotid healthy.
Faints if he sits up for more than fifteen minutes.	Frequent attacks of catarrh.	. . . . .	. . . . .	Aneurism of innominata lying behind and a little to right of the upper extremity of sternum; cartilages of trachea absorbed, its caliber diminished more than half.
No pulsation in the right subclavian, brachial, or radial arteries.	. . . . .	. . . . .	. . . . .	An hour after death the tumour had disappeared, leaving a depression in its place. The aneurism engaged two-thirds of the innominata, the carotid to its bifurcation, and the subclavian; the latter being obliterated; sac had not burst; aorta greatly enlarged.
Right radial pulse stronger than left; lengthened interval between stroke of heart and radial pulses; palpitation of heart and pain in cardiac region.	. . . . .	Dulness on percussion over region occupied by tumour.	Above the clavicle an obscure murmur with sac's diastole, a feeble cooing sound with systole; both feebler the more the heart is approached.	Innominata transformed into an elongated sac; heart dilated; one of the aortic valves folded back, thus allowing regurgitation.
Radials, subclavians, and carotids equally strong on both sides; pressure on right carotid stopped the pulsations in the tumour more completely than compressing the subclavian.	. . . . .	Right subclavian space sounded dull.	Double pulsation over the dull space, becoming weaker towards heart, with feeble <i>bruit de soufflet</i> ; neither thrill nor <i>bruit</i> in tumour above the clavicle.	Aneurism of the innominata engaging the transverse arch to origin of carotid, which is slightly dilated; the descending aorta, as low as the diaphragm, dilated, and calcareous deposits upon it; right lung condensed at its superior part from pressure of the sac.
Carotids pulsated normally; right subclavian and radial scarcely to be felt.	. . . . .	No dulness on percussion.	No <i>bruit</i> over any part of tumour; action of heart healthy; no absence of respiration in any part of the chest.	Aneurism of the innominata, extending from the cricoid cartilage to the arch of the aorta, the latter being slightly involved; rupture into the right pleura.
Pulse in right wrist imperceptible; for a month before death no pulsation could be felt in the carotids.	. . . . .	. . . . .	<i>Bruit de soufflet</i> over the tumour; moist râles over both sides of the chest.	Aneurism of the entire anterior wall of the innominata spontaneously cured, the vessel being obliterated; extensive atheromatous deposit in aorta; left carotid, right carotid, and subclavian blocked up with fibrine; left vertebral and subclavian enlarged; tubercular cavities in lungs.
No pulsation in right brachial or radial; 76 in left; carotids equally strong; veins in front of neck on the right side were dilated.	. . . . .	. . . . .	. . . . .	Enormous lobulated aneurism of innominata pressing on the trachea; dislocation of sternal end of clavicle; aneurism of the arch the size of a nutmeg; right subclavian obliterated at its orifice; right vertebral, thyroid, and internal mammary obliterated at their origin; right subclavian vein lost in the walls of the sac.
Right pulse smaller and weaker than left; veins on face, neck, chest, and abdomen enlarged.	. . . . .	. . . . .	At the middle of upper portion of sternum the heart's action can be heard accompanied by a slight bellows sound.	Aneurism of the innominata; internal jugular and brachio-cephalic veins obliterated; lymph in the pericardial sac; thoracic duct involved in the dense structures round the tumour.
Pulse very indistinct in right wrist, while none could be felt in the brachial or subclavian; veins of head and neck engorged, especially on the right side.	Respiration intensely puerile in left lung, very feeble in right; bronchitis in left lung.	Dulness at external end of right clavicle.	Double pulsation at sternal end of right clavicle, with strong impulse, becoming weaker as the heart was approached; no <i>bruit de soufflet</i> in any part of the chest.	Aneurism of the innominata; right carotid artery and jugular vein obliterated; right and left veins innominate and subclavian obliterated; arteries of left side unaffected; aorta dilated, its coats thickened; apex of right lung compressed, as was also the trachea.
Right pulse smaller than the left.	. . . . .	. . . . .	No <i>bruit de soufflet</i> .	Aneurism of the innominata had opened into the trachea by a very small orifice; atheromatous deposit on aorta; the vertebral rose from the arch; a coagulum was found in the right subclavian artery.
Right radial and carotid pulsated weaker than the left; thrilling sensation felt in the subclavian and carotid.	. . . . .	. . . . .	. . . . .	Aneurism of the innominata and arch of the aorta had displaced the trachea and oesophagus to the left, and the descending vena cava to the right, it pressed the right subclavian and carotid arteries against the spine; aortic valves ossified.

No.	By whom Reported.	Sex.	Age.	Tumour and Impulse.	Dyspnœa.	Cough and Voice.	Dysphagia.	Pains.
27	Dr. Mott,	M.	51	Pulsating tumour under the insertion of right sterno-mastoid and within the chest, as low as the second rib.	Whceezing in breathing, increased by exercise.	. . . . .	. . . . .	Œdema and numbness of right arm.
28	Dr. Morrisson.	M.	42	A pulsating tumour between the insertions of the right sterno-mastoid.	Dyspnœa increased by walking.	. . . . .	. . . . .	Pain in right side of head and neck, also in cardiac region.
29	M. Genest,	M.	44	Pulsating tumour extended from right clavicle to the chin; gangrenous ulcer at its apex.	Paroxysms of dyspnœa.	. . . . .	Difficulty in swallowing.	Right arm paralysed.
30	M. Michon,	. . . .	. . . .	A pulsating tumour, a little to the right of the median line of sterno-mastoid, had pushed the larynx to the left side.	Attacks of suffocation.	Voice short, finally inaudible; slight cough.	No dysphagia.	No hemiplegia.
32	M. Boinet,	M.	57	A pulsating tumour, on right side, extended from the sixth rib to the superior border of thyroid cartilage; trachea dislocated and compressed; clavicle dislocated.	Orthopnœa.	Violent fits of coughing, causing congestion of face, and loss of consciousness; voice feeble.	. . . . .	Pain in the head.
33	M. Mazet,	F.	47	Pulsating tumour behind right sterno-mastoid muscle, extending into the chest.	Dyspnœa.	Cough, with expectoration.	. . . . .	. . . . .
34	M. L'Hommeau,	M.	40	A pulsating tumour in the neck.	Dyspnœa.	. . . . .	. . . . .	Pain along the œsophagus, in right side of neck and arm; left arm cold and blue.
35	M. Chapelle,	M.	46	A pulsating tumour, its base covered by the sternum and inner part of right clavicle.	Difficulty of breathing. Died asphyxiated.	Voice a little hoarse.	Slight difficulty in swallowing.	Pain in right shoulder and arm, at times very intense.
37	M. Dubrueil,	M.	37	Pulsating tumour above the right sterno-clavicular articulation; clavicle dislocated, and sternum pushed forward before death. A second tumour as high as fifth cervical vertebra.	Dyspnœa increased as the tumour enlarged.	Frequent cough; voice weak and cavernous.	. . . . .	Pain in upper part of chest, low down in the neck and right arm.
39	M. Dubrueil,	M.	Middle aged.	A pulsating tumour extended from internal third of right clavicle (where it first appeared) to sternal insertion of left sterno-mastoid, and into the chest as low as the third rib.	Dyspnœa.	Violent fits of coughing, without expectoration; voice raucous; aphonia at times.	Deglutition always difficult, and sometimes impossible.	Right arm œdematous, right side of face wasted.
44	Dr. Hampeis,	M.	62	A pulsating swelling between second and third ribs, on right side, finally it spread over the sternum.	. . . . .	Cough, with bloody expectoration.	Difficulty in swallowing.	Feeling of cold down right arm; burning pain in the throat.
45	Dr. De Renzi,	M.	46	No tumour mentioned.	Difficulty in breathing; trachea filled with mucus difficult to be expectorated.	Convulsive cough, and slight aphonia.	Difficulty in swallowing.	Pain in right clavicular region, loss of sensibility in right arm; vague pain in throat extending finally to left side, shoulder, and arm, with numbness.

Heart, Arteries, and Veins.	Respiration.	Percussion.	Auscultation.	Post Mortem Appearances.
No right radial pulse, and the carotid on that side weaker than the left.	Respiration interrupted by pressing the tumour.	. . . .	<i>Bruit de soufflet</i> over the tumour.	Aneurism of the innominate engaging the root of the carotid and subclavian; trachea quite flattened; clavicle dislocated.
Pressure on the right carotid did not diminish the size of tumour, but right pulse became fuller; pressure on right subclavian rendered pulsations of the tumour stronger.	. . . .	. . . .	. . . . .	Aneurism of the innominate and root of carotid; it had not ruptured; the arch dilated, and calcareous deposits on it.
Right pulse weaker than the left.	Respiration accompanied by hissing sound.	. . . .	. . . . .	Aneurism of the innominate; the carotid and subclavian of the usual size, and not compressed; trachea, larynx, and oesophagus very much compressed from the right side.
Right radial pulse very small as compared with the left.	Respiration short, in the end scarcely audible.	Right sterno-clavicular articulation dull on percussion.	<i>Bruit de soufflet</i> over the chest, extending into right carotid.	Aneurism of the innominate; trachea pushed to the left side, but not flattened; right recurrent nerve compressed.
Right carotid pulsated more feebly than the left; radial pulses equal; veins on and about the tumour dilated.	Expiration sibilant.	Superior part of the chest dull on percussion.	<i>Bruit de soufflet</i> over the tumour; no abnormal sound on left side; oegophony on the right as high as first dorsal vertebra.	Aneurism of the innominate compressing the carotid, trachea, bronchi, and oesophagus; the latter perforated; larynx also perforated; trachea so compressed as to be triangular; pulmonary artery and veins compressed; aortic valves insufficient.
No abnormal sound with the heart's action; no pulsation in the right radial, brachial, or carotid.	. . . .	. . . .	A sound analogous to first sound of heart heard under right clavicle; mucous and sonorous râles.	Vast aneurism of the innominate; right subclavian and carotid impermeable; trachea displaced a little to the left, and compressed; no dilatation of the aorta; softened tubercles in both lungs.
No pulsation in left radial or humeral arteries; right radial normal.	Sibilant respiration.	. . . .	Double pulsation heard at the top of sternum; sibilant and sonorous râles over the chest.	Dilatation of innominate; recent clot in left subclavian vein; left carotid arose by two distinct branches from the arch.
Right radial pulse smaller than the left.	. . . .	. . . .	Prolonged impulse over tumour, then a pause, followed by a short, clear sound; the motion and sounds not synchronous with heart.	Aneurism of the innominate engaging the carotid and subclavian.
Right radial and brachial arteries very feeble.	Respiration sibilant.	. . . .	<i>Bruit de râpe</i> over the tumour; <i>bruit de soufflet</i> over the chest; pulsations of tumour easily distinguished from those of the heart.	The innominate double its usual size, and almost entirely obstructed by solid fibrine; aneurism of transverse portion of the arch, inclining to the right, had burst into the trachea; the tumours flattened after death.
Left pulse natural; right radial and carotid very weak; no pulsation in right temporal.	Respiration loud and wheezing.	. . . .	Loud <i>bruit de soufflet</i> over the part within the chest, while a purring murmur is heard over the external part of the tumour.	The entire of innominate aneurismal; arch perfectly healthy; a coagulum rendered right carotid impermeable; subclavian diminished in size; flattening of four rings of trachea; sac had burst externally.
Heart's action irregular; veins on right side of chest varicose; occasional faintings.	. . . .	. . . .	. . . . .	An enormous aneurism of innominate had absorbed the upper part of sternum and superior ribs on right side.
Rhythm of heart irregular; left pulse very quick; no pulsation in right radial, brachial, or carotid.	. . . .	Entire chest dull on percussion.	Pectoriloquism over inferior of right lung anteriorly, and signs of cavity.	Aneurism of innominate, engaging the aorta, filled by a mass of fibrine, extending into the carotid; tubercles and a cavity in the inferior lobe of lung.

On contrasting the foregoing Table with Dr. Greene's, there will be found—

In Dr. Greene's Table of twelve cases of aneurism of the transverse portion of the arch:

1st.—External tumour in *one* case.

2nd.—Prominence of the upper portion of the sternum, or fulness of the infra or supra-clavicular region, in *eight* cases.

3rd.—Absence of tumour or elevation in *four* cases.

4th.—*No* dislocation of larynx or trachea.

5th.—*No* case in which dislocation of the clavicle occurred.

6th.—General venous congestion over the chest in *seven* cases.

7th.—Enlarged veins, confined to the chest and left arm, in *one* case.

8th.—Dyspnœa, more or less intense, in *eleven* cases.

9th.—Cough in *twelve* cases.

10th.—Hemoptysis in *two* cases, without tubercles existing in the lungs.

11th.—Voice altered in *six* cases.

In the Table of twenty-four cases of aneurism of the arteria innominata:

1st.—External tumour in *twenty-one* cases.

2nd.—Well-defined tumour above the inner third of the right clavicle and sternum in *twenty* cases; between second and third ribs on the right side in *one* case.

3rd.—No tumour mentioned in *three* cases.

4th.—Dislocation of larynx or trachea in *four* cases.

5th.—Clavicle dislocated in *four* cases.

6th.—Venous congestion of the right side of the body in *four* cases.

7th.—Venous congestion not confined to left side of the body in *any* case.

8th.—Dyspnœa, more or less intense, in *nineteen* cases.

9th.—Cough in *fifteen* cases.

10th.—Hemoptysis in *three* cases; one had tubercular cavities in the lungs.

11th.—Voice altered in *ten* cases.

12th.—Dysphagia in *nine* cases.

13th.—Pain over and around the chest in *eight* cases.

14th.—Pain confined to left side of the chest in *one* case.

15th.—Pain in right side of the head, neck, and right arm, not mentioned in *any* case.

16th.—Pain did not extend in *any* case from the right to the left side of the body.

17th.—Œdema not confined to right arm in *any* case.

18th.—Œdema of both arms in *two* cases.

19th.—Œdema of the lips and ankles in *one* case, and of the eyelids in *another*.

20th.—Œdema of the glottis in *two* cases.

21st.—Numbness of left arm in *one* case.

22nd.—Partial loss of sensation or motion was not confined to right arm in *any* case.

23rd.—Numbness of both arms in *one* case.

12th.—Dysphagia in *ten* cases.

13th.—Pain over the chest in *one* case.

14th.—Pain through left side of the head and neck in *one* case.

15th.—Pain in right side of the head, neck, and right arm in *twelve* cases.

16th.—Pain beginning in right side of the head, neck, or right arm; but finally extending to the left side in *two* cases.

17th.—Œdema of right arm in *four* cases.

18th.—Œdema began in the right and extended to the left arm in *one* case.

19th.—Œdema of the right side of the face and left arm in *one* case.

20th.—Œdema of the glottis *not* mentioned.

21st.—Numbness of left arm in *one* case.

22nd.—Partial loss of sensation or motion in right arm in *four* cases.

23rd.—Numbness began in the right arm and extended to the left in *two* cases.

24th.—Pulsations of left radial artery weaker than the right in *three* cases.

25th.—Pulsation of right radial weaker than the left in *two* cases.

26th.—Pulsation not absent in both radials in *any* case.

27th.—Respiration stridulous or wheezing in *eight* cases.

28th.—Percussion gave a dull sound over the part of the chest occupied by the tumour in *nine* cases.

29th.—Respiratory murmur weaker in left than in right lung in *eight* cases.

30th.—Respiratory murmur weaker in right lung in *one* case.

31st.—Double sound, similar to the sounds of the heart, heard over the tumour in *one* case.

32nd.—An abnormal arterial murmur heard over the sac in *eight* cases.

33rd.—In *four* cases it is stated that no abnormal arterial murmur was heard.

24th.—Pulsations of right radial, brachial, subclavian, or carotid arteries, weaker than on the left side in *nineteen* cases.

25th.—Pulsation in left radial weaker in *one* case.

26th.—Pulsation absent in both carotids in *one* case.

27th.—Respiration stridulous or wheezing in *five* cases.

28th.—Percussion gave a dull sound over the part of the chest occupied by the tumour in *five* cases.

29th.—Difference in respiratory murmur *not* recorded.

30th.—Respiratory murmur weaker in right lung in *one* case.

31st.—Double sound, similar to the sounds of the heart, heard over the tumour in *six* cases.

32nd.—An abnormal arterial murmur heard over the region of the sac in *ten* cases.

33rd.—In *three* cases it is stated that no abnormal arterial murmur was heard.

The order of frequency of the symptoms and signs were as follow:

In the twelve cases of aneurism of the transverse portion of the arch :

Cough occurred in . . .	12
Dyspnœa in	10
Respiratory murmur altered in	9
Dysphagia occurred in . .	9
Pain in	9
Dulness on percussion in .	9
Congestion of superficial veins in	8
Stridulous respiration in .	8
Arterial murmur in . . .	8
Voice altered in	6
Alteration in the arterial circulation in	5
Œdema occurred in . . .	3
Partial paralysis in . . .	2
Hemoptysis in	1
Double sound over the sac in	1
Larynx dislocated in . . .	0
Clavicle dislocated in . . .	0
External well-defined tumour in	0

In the twenty-four cases of aneurism of the arteria innominata :

External tumour in . . .	21
Alteration in the arterial circulation in	20
Dyspnœa in	19
Pain in	16
Cough in	15
Dysphagia in	10
Abnormal arterial murmur in	10
Voice altered in	10
Partial paralysis in . . .	7
Double sound over the sac in	7
Œdema in	6
Stridulous respiration in .	5
Dulness on percussion in .	5
Larynx or trachea dislocated in	4
Clavicle dislocated in . . .	4
Venous enlargement in . .	4
Hemoptysis in	2
Respiratory murmur altered in	1

From this it is evident, that there is a well-marked difference as to the probabilities of certain symptoms and signs presenting themselves in these affections, and I shall examine them in the order of their frequency in innominatal aneurisms.

External Tumour.—Aneurisms tend to enlarge in the direction in which the distending force is applied; hence, a sac situated immediately above the aortic valves passes downwards

in obedience to the force of the returning column of blood, and as the direction of the current in the innominata is upwards and to the right side, a tumour formed on this vessel presents itself, in the great majority of cases, above the inner third of the right clavicle,—while the high position of the artery in the neck renders this one of the earliest symptoms. In aneurism of the transverse portion of the arch, the sac comes in contact with the posterior surface of the sternum; hence, external tumour is by no means so frequent as in the former case, and when it does occur it generally appears at one side of that bone, usually on the left, as the current is passing towards that side of the body. If the aneurism forms at the most superior part of the arch, it is resisted by the convex surface of the trachea behind, and by the sternum in front; then, passing upwards, it appears between the sterno-clavicular articulations; but in these exceptional cases the tumour does not show itself in the neck until the sac has acquired considerable size.

Alteration in the Circulation.—M. Tarral^a, in a review of Wardrop's book on Aneurism, remarks, that feebleness of the pulsation in an aneurismal artery may be caused by the weight and volume of the sac compressing the vessel; “but if this compression is not produced, its caliber is augmented, and then we ought not to expect a diminution in the pulses, but rather an increase in intensity.” This is in direct opposition to the law, that a dilatation on an elastic tube, through which fluid is sent *per saltum*, has the effect of weakening the force of the current and converting an interrupted into a continuous stream, while the pressure of the sac on the vessel may still further lessen the volume of the fluid; but this latter condition is not essential to its production. The arterics given off from an aneurismal vessel ought, therefore, to pulsate weaker than in the healthy condition, or than the corresponding arterics on the opposite side of the body. We might therefore conclude, from *a priori* rea-

^a Journal Hebdomadaire de Médecine, 1829, vol. iv. p. 560.

soning, that in innominatal aneurism the pulses on the right side of the neck and in the right arm would be weaker than those in the left, and this is borne out by the cases before us.

Dr. Greene^a remarks, that “retardation of the pulse was only well marked in the eighth case; and when it occurs, it is more characteristic of pressure on the main trunk than a feeble pulse in one wrist, which latter may depend on a high division of the radial;” and though the pulse at the wrist is naturally a little later than the impulse of the heart, still the interval must have been longer than usual in this instance, otherwise it would not have been particularly noticed. The same was observed in Dr. Henderson’s case, No. 8; and this is confirmed by M. Dubrueil, who, alluding to this sign as a help in the diagnosis, says^b, “that when a tumour is situated on the innominata, or on the origin of the left subclavian, the pulse of the corresponding side ceases to be synchronous with that in the opposite arm,—sometimes even pulsating after its fellow, as well as being less developed;” but the diagnostic value of this sign can only be determined by future observations. Aneurism of the arch must affect equally the pulses on both sides of the body; but the tendency of the sac to enlarge towards the left should make us expect that it would in some cases compress the arterial trunks on that side, thereby causing the left pulses to be the weaker; this is confirmed by Dr. Greene’s and by other cases. A tumour of any kind pressing on the great vessels will cause comparative weakness, or even total absence of pulsation in the carotid, subclavian, or brachial; hence the fact of the right pulses being weaker can only aid us in the diagnosis, *after* the aneurismal character of the disease has been established by other symptoms: for example,—Dr. Watson^c gives a case of exostosis on the first rib causing displacement of

^a *Loc. cit.* page 23.

^b Obs. et Réflex. sur les Anévrysmes de la Portion Ascend. et de la Crosse de l’Aorte, p. 157.

^c Lectures on the Principles and Practice of Physic, Third Edition, vol. i., p. 308.

the clavicle and absence of the pulse in the corresponding arm. Another source of error is, the occasional anomalous distribution of the vessels; this most frequently occurs in the radials, but by examining the other vessels on the same side we shall be enabled to correct an opinion founded on the state of one artery: a clot, or any change in the interior of the vessel, may lessen the circulation through it, but the obstruction is at times only temporary, and if pulsation is absent or almost imperceptible in one vessel, while it remains also weaker in the other arteries on the same side, it would increase the probabilities that the trunk from which these vessels arose was aneurisinal; for example,—if the right subclavian is obstructed, the velocity of the current in the right carotid will be increased until the effects of the aneurism are sufficient to counteract the hydraulic law, that if there are two orifices for the exit of a fluid, the closing of one increases the velocity of the current through the other. It is in this way the increase in size of the anastomosing vessels after a ligature has been applied is to be explained; and it were well to bear this observation in mind before operating on large arteries,—for in Case No. 1, pulsation could not be felt in the right carotid, but it re-appeared on the second day after the subclavian had been tied. This hydraulic law is well illustrated by Case No. 28, in which pressure on the right carotid increased the force of the pulsations in the subclavian, and *vice versâ*; but in order to produce this effect, both outlets must be free,—for in Case No. 2, pressure on the right subclavian increased the force of the pulsations, the sac being obliged to act more strongly, in order to make what had originally passed through two vessels now pass through one; but the pulsations were diminished by compressing the carotid,—for, on obstructing the main outlet, the sac became so full that it was unable to contract on its contents. In Case No. 4, the subclavian appears to have been in part obstructed, while the carotid remained comparatively free; and pressure on the subclavian causing the *bruit* in the carotid to cease is to be explained by the latter vessel be-

coming distended with blood, thereby removing the conditions necessary for the production of arterial murmurs; and the *bruit* being increased in the subclavian when pressure was applied to the carotid is referrible to the obstruction in the former being in part overcome, and the current passing with greater velocity through this partly-filled artery.

Dyspnœa.—We have seen that dyspnœa is rather less frequent in innominatal than in aortic aneurisms, and this is to be accounted for by the enlargement of the one being prevented by the sternum, thereby causing it to press more forcibly on the trachea than an innominatal aneurism could, as the latter can extend in all directions. Further, the lung or pulmonary artery is far more liable to be compressed in cases of aortic aneurism; and the left pneumogastric nerve, crossing the arch, brings it frequently in contact with aneurism of that part of the vessel, while the position of the right pneumogastric does not subject it to be compressed by aneurism of the innominata. Thus the anatomical relations explain why dyspnœa should be more frequent in aortic aneurism.

Pain.—This symptom appears to be less frequent in innominatal aneurism, and it has a marked tendency to begin in the right side of the neck, right shoulder, and arm, extending from this to the opposite side in some cases. This is to be explained by the position of the sac, which requires to have enlarged considerably before it can press on the nerves going to the left side of the body. In some cases the pain was so intense as to form the chief subject of complaint, but its limitation, intensity, paroxysmal and apyrexial character, prove that it belongs to that class of pains caused by pressure on the nerves. There is in many cases a dull, gnawing, constant pain, which Dr. Law^a considers to originate in the changes produced in bone by the pressure of an aneurismal tumour. That this double character of pain occurs independent of aneurism will be seen by re-

^a Dublin Journal of Medical Science, First Series, vol. xxi. p. 469.

ferring to Dr. Battersby's^a paper on Exostosis of the Spine; and further, bone may be extensively destroyed without pain being complained of; this Dr. Redfern^b has proved to be true regarding articular cartilage; and the following cases extend its applicability to the osseous system:—An aneurism^c of the transverse portion of the arch had caused an opening, the size of a shilling, in the sternum, through which the internal communicated with the external tumour, yet the patient enjoyed good health, and never complained of pain. M. Valleix^d records a case in which the second, third, fourth, and fifth dorsal vertebræ were completely destroyed, the sac being only separated from the cord by the membranes, yet neither pain nor other symptom had occurred that could lead to the supposition that such extensive disease existed. An important question here suggests itself, viz., Do cancerous or other non-aneurismal tumours cause absorption of bone? M. Dubrueil^e observes, “that aneurisms are not the only intra-thoracic tumours that dislocate, destroy, and perforate bones;” and though such cases may be recorded, I can only find two that bear upon this inquiry, viz.: cancer^f of the œsophagus immediately above the cardiac orifice of the stomach, in which the bodies of the vertebræ behind the tumour were “softened and in a state of dissolution;” and M. Cayol^g states that he has seen the dorsal vertebræ corroded by the contact of a cancerous mass. If these cases can be considered as examples of the absorption of bone, they form exceptions to a rule which, if placed beyond doubt, would form a valuable diagnostic symptom of aneurismal disease, viz., that aneurismal sacs are the only intra-thoracic tumours which by their pressure can cause absorption of bone.

* Dublin Journal of Medical Science, First Series, vol. xxiv. p. 86.

^b On Diseases of Articular Cartilages. ^c Gazette des Hôpitaux, 1850, p. 482.

^d Archives Générales de Médecine, vol. xxii., 1850, p. 430.

^e Observ. et Réflex. sur les Anévrysmes de la Portion Ascend. et de la Crosse de l'Aorte, p. 165.

^f Thèse, par M. Aussant, No. 19, 1801.

^g Dictionnaire de Médecine, en 30 vols. Art. “Estomac,” p. 365.

Cough.—It is only necessary to allude to the position of the tumours, to the relations of the recurrent laryngeal winding round the arch on the left side and the subclavian on the right, and to the communication of this motor branch with the superior laryngeal or sensory nerve of the larynx, in order to explain why cough should be the most frequent symptom in aneurisms of the arch, while it was present in only five-eighths of the cases of innominatal aneurism.

Dysphagia.—This symptom is nearly twice as frequent in aortic as in innominatal aneurism, although, looking to the relations of parts, the reverse ought, at first sight, be the case; for it is difficult to conceive how the œsophagus could be compressed, as the trachea intervenes between it and the arch, while the lateral and high position of the innominata would appear to have placed it in circumstances more favourable for the production of dysphagia. It is to physiology we must look for the explanation of this apparent anomaly.

M. Claude Bernard, in his lectures at the College of France during the summer months of 1851, demonstrated, that section of the pneumogastric nerves caused forcible contraction of the lower part of the œsophagus. A rabbit, in whom these nerves had been divided, ate after the operation, but in a short time the food was regurgitated as fast as swallowed, and on killing the animal it was found that none of it had entered the stomach; the entire mass lay piled up in the œsophagus; and M. Bernard stated, that if the experiment was performed on a horse, the animal killed, the œsophagus cut across, and the stomach filled with water through the pyloric extremity, the cardiac orifice would contract with so much force that pressure might be applied on the stomach sufficient to rupture its walls, yet none of the fluid would escape through the cut end of the œsophagus, and this contraction persists for twenty-four hours after death. Dr. Greene remarks^a, “that in thoracic aneurism the

^a *Loc. cit.* p. 20.

dysphagia is deep-seated or intra-thoracic; but at the same time a spasmodic stricture may exist higher up in the tube;" and he goes on to observe, "that stricture from scirrhus, or other organic lesion of the œsophagus within the chest, is sometimes accompanied by a similar spasmodic state of the tube higher up, and can be explained on the doctrine of reflex irritation through the spinal marrow;" thus he was obliged to admit the existence of what at the time he wrote was a purely imaginary state of spasm, in order to explain the frequent occurrence of dysphagia in cases where the *post mortem* failed to exhibit marks of compression of the œsophagus; on examining Dr. Grecne's Table, I find in Cases No. 7 and 8 dysphagia existed, yet no mention is made of the state of the œsophagus; in No. 12 this symptom existed, but there was "no apparent pressure on the œsophagus," and in No. 4 dysphagia was not complained of, though the aneurism "formed an oval tumour in the œsophagus." The frequency of dysphagia in aneurisms of the transverse portion of the arch is therefore, I believe, in many cases to be explained by the pressure exercised by the sac on the left pneumogastric nerve, as it passes over the arch, causing forcible contraction of the lower part of the œsophagus. This will be again noticed when considering the respiratory phenomena.

Abnormal Arterial Murmurs.—These sounds have a tendency to extend in the direction in which the current is passing, hence they are heard in the right carotid or subclavian in innominate aneurisms, while the murmur was confined to the region occupied by the sac in all Dr. Greene's cases in which this sign occurred, and if the sound was propagated in this latter affection, it would most probably be into the vessels on the left side, or, as has been frequently observed, downward along the spinal column posteriorly. It is improbable that a lesion confined to the innominate would cause a murmur to pass along the descending aorta, as, in order to get into this vessel, it should be prolonged in the opposite direction to that

of the blood passing through the former: the only case in which it might probably occur is that of an innominatal sac compressing the arch so as to diminish its caliber. The direction in which the arterial murmur extends will, therefore, be a guide to us in the diagnosis, and future observations should be directed to determine if an innominatal aneurism is capable of causing a murmur along the descending aorta. Dr. Greene^a has often heard a *bruit de soufflet* and impulse in the arch, or even in its branches, in cases where tubercles had begun to be deposited in the lungs. M. Dubrueil^b made a similar observation in a case of acute phthisis, in which he was led to suspect the existence of an aneurism of the arch, but the autopsy showed it to have been caused by the convexity of the arch being on a level with the superior end of the sternum. Professor Harrison^c remarks, that "the innominata in some subjects ascends much higher than usual in the neck before it divides; in some persons I have seen it distinctly pulsating on the trachea above the sternum." This explains such cases as that of Dr. Houston's^d, and proves that abnormal pulsation and perhaps murmur may exist without any other lesion being present than an unusually high position of the vessels.

Alteration of the Voice being most frequent in aortic aneurism is to be attributed to the position of the sac, rendering it more liable to compress the trachea or recurrent laryngeal nerve, than if the disease was confined to the innominata. In order to prove that pressure on the latter is capable of altering the tone of the voice, it is only necessary to refer to the highly interesting case brought before the Pathological Society of London, by Dr. Brinton^e, as well as that recorded by Mr. Birkett^f. Œdema of the glottis, which Dr. Greene includes

^a *Loc. cit.* p. 29.

^b *Op. cit.* p. 154.

^c *Surgical Anatomy of the Arteries*, 1839, p. 24.

^d Mentioned in Dr. Greene's paper, *loc cit.* p. 28.

^e *Medical Times and Gazette*, January, 1852, p. 97.

^f *Medical Times and Gazette*, February, 1852, p. 136.

among the causes of this phenomenon, did not occur in any case of innominatal aneurism.

Partial Paralysis.—This symptom was present in nearly a third of the cases of innominatal aneurism, and the relations of the tumour with the right brachial plexus explains why loss of sensation or motion began in the right arm in all the cases, with but one exception. Weakness of the left arm was complained of in one case of aortic aneurism; partial loss of power over both arms in another; but this latter symptom is comparatively rare.

Œdema began on the right side in the six cases of innominatal aneurism in which this symptom is mentioned, and may have been caused by pressure of the sac on the right vena innominata, rendered still more probable by the enlargement of the superficial veins being greater on the right side; still, pressure on the right common lymphatic duct may have been an additional cause of œdema.

Double Sound over the Sac.—The difference in the frequency with which this sign occurs in these affections is very remarkable, as it was heard seven times in innominatal, and only once in the cases of aortic aneurism.

Two opinions are entertained regarding this phenomenon, in one it is considered to originate in the sac, in conformity with which view Drs. Bellingham^a and Lyons^b have endeavoured to explain its occurrence; in the other it is referred to the second sound of the heart being propagated to the tumour. That the aneurismal sounds are often louder than those of the heart does not disprove that they may have originated in that organ, for their intensity would be increased by its being multiplied on the walls of the sac, in the same way as Dr. Stokes has explained why the pulsations of the aneurism are frequently more violent than those of the heart^c, and the state of parts through which

^a Dublin Medical Press, vol. xix. p. 260, *et seq.*

^b Dublin Quarterly Journal of Medical Science, New Series, vol. ix. p. 343.

^c Dublin Journal of Medical Science, First Series, vol. v. p. 432.

the sounds pass before they reach the ear, explains the difference in their tone. In a case of aneurism of the arch of the aorta, which I had an opportunity of examining in the Royal Infirmary of Edinburgh, double sound was heard over the tumour, without the faintest murmur, while a distinct *bruit de soufflet* accompanied both sounds of the heart; this, and similar cases, argue in favour of the opinion that an aneurismal sac can, *per se*, produce sounds similar to those of the heart, for, on the principle just stated, murmurs having their origin in the aortic valves ought to be louder over the aneurism than at the heart.

Dr. Watson^a states, that double sound has been heard by himself and others over a popliteal aneurism, and he refers it to the flapping of the aortic valves. But how are we to explain that the faintest attempt at the production of a second sound is not heard in such cases either above or below the dilatation, and yet admit, that the heart's sounds are propagated to so great a distance as the popliteal artery is from the centre of the circulation. The position of innominatal aneurisms is such as would allow the forcible expansion and contraction of the sac, and this might in part explain the frequency of this phenomenon in disease of that vessel; but we are here met by the paradox, that aneurisms of the abdominal aorta, which are in no way confined by surrounding parts, rarely, if ever, give origin to a double sound. We are therefore obliged to take the facts as they are presented to us, and while using them for the purposes of diagnosis, trust to future observation for their explanation.

Stridulous Respiration.—It is only necessary to refer to the remarks that have already been made regarding the relations of aortic aneurisms to the trachea, pneumogastric and recurrent laryngeal nerves, in order to explain why stridulous respiration is nearly twice as frequent in these as in innominatal aneurisms.

^a Lectures on the Principles and Practice of Physic, vol. ii, p. 311, Third Ed.

Percussion.—The exact size of the tumour may be marked out by percussing on the pleximeter, as stated by M. Piorry in Case 41; but the position of aortic aneurism renders this more necessary than in innominatal aneurism, as in the latter the sac appears, almost as soon as formed, above the right sterno-clavicular articulation, and we see by the Table that dulness existed in nine cases of the former, and in only five of the latter disease; but this is a valuable means of diagnosis, as it enables us to map out on the skin the exact position and size of the intra-thoracic tumour.

Displacement of the Larynx or Trachea.—Aortic aneurisms seldom reach high enough, or occupy a sufficiently lateral position in the neck, to cause displacement of any part of the air-tube, and even aneurisms of the innominata must have acquired considerable size before they produce this symptom; it occurred in four cases of the latter, and in none of those contained in Dr. Greene's Table.

Dislocation of the Right Clavicle.—Nothing could be more favourable for its occurrence than the position of the innominata, but the free exit from the chest allowed to these aneurisms renders this one of the least frequent symptoms, and though it occurs still less often in aortic aneurisms, yet its analogue, namely, protrusion of the sternum, is observed in many cases of this latter affection.

Venous Congestion.—From the cases before us it appears that this is among the most frequent symptoms of aortic, and one of the rarest in innominatal aneurisms, but the proportion in which it occurs in the latter will be probably increased by future observations. Dr. Greene remarks^a, “that the more localized or limited the congestion, the greater probability of its dependence on the obliteration of a single trunk; the more general or unlimited, the greater the probability of its dependence on valvular disease of the heart.” We may, perhaps, go still farther, and state, that in cases of aneurism, the more the ve-

^a Dublin Quarterly Journal of Medical Science, New Series, vol. ii. p. 8.

nous engorgement is confined to the right side of the body, the greater the likelihood of the disease being innominatal, for though the left vena cava crosses the arteria innominata, still, in all cases of disease of that vessel in which this symptom appeared, it began at the right side of the chest, neck, or right arm.

Hemoptysis.—This is the rarest of all the symptoms of internal aneurisms, as will be seen by reference to the Tables.

Alteration in the Respiratory Murmur.—M. Chomel^a was the first to point out, that difference in the intensity of the respiratory murmur in the opposite lungs, occurring without disease of these organs, was indicative of internal aneurism. He observed complete absence of respiration over the left side in a young girl suffering from aneurism of the transverse aorta, and he considered it to be caused by the pressure of the sac on the left bronchus. Mr. Porter^b was the first among British authors to mention this sign; and Dr. Stokes drew particular attention to its diagnostic value, in his *Researches on the Diagnosis and Pathology of Aneurism*^c. In eight of Dr. Greene's cases the respiration was weaker over the left lung; and in the case of innominatal aneurism recorded by Dr. Stokes, No. 19, the right lung acted very feebly; but as the sac compressed the trachea, it ought to have produced the same effect on both lungs. Can, then, the respiration be rendered weaker in one lung, without the lung or bronchus leading thereto being compressed or obstructed? M. Claude Bernard divided the pneumogastric nerves in a dog,—the respiration immediately fell from twenty to thirteen per minute; and there is every reason to believe, that section of one of these nerves would produce slowness and feebleness of respiration in the corresponding lung^d. In Dr. Stokes' case, "the vagus nerve also was

^a Archives Gén. de Médecine, 1829, vol. xxi. p. 447.

^b Dublin Journal of Medical Science, First Series, vol. iv. p. 211.

^c Ibid. vol. v. p. 416.

^d See Edin. Med. and Surg. Journal, vol. xlix. p. 165, *et seq.*, for Dr. Reid's investigations on the functions of the right pair of nerves.

compressed:" this was, I believe, the cause of weak respiration in the right lung^a.

From the foregoing review of the symptoms present in these affections, the following rule may be deduced, viz.: *That the symptoms and signs of innominate aneurisms have a general tendency to occur on the right side of the body, and those of aneurism of the transverse portion of the arch of the aorta, on the left.* This has not escaped the notice of many of the authors

^a In order to confirm or refute this opinion, I instituted the following experiment :

March 12. A two-year old, well-formed, healthy ass was cast, and the right carotid artery exposed, by Mr. R. Olden, Veterinary Surgeon; the sympathetic nerve was separated from the pneumogastric, and I excised a quarter of an inch of the latter; Dr. Hare was present at the operation. At 6 o'clock, immediately after the nerve was excised, respiration was louder and quicker than natural in both lungs, but in a few minutes the action of the right lung became weaker, and at 7 o'clock it acted feebler than its fellow on the opposite side; at 8 o'clock Dr. John Murphy examined the animal, and gave it as his opinion that the right lung acted feebler than the left.

March 13, 1 o'clock. Dr. Murphy observed a marked difference between the intensity of the respiratory murmur in the right and left lung, it being weaker on the right side.—4 o'clock; Dr. Finn examined the chest, and considered the respiration in the right lung to be weaker than in the left.—5 o'clock; Mr. G. Olden, Veterinary Surgeon, measured the circumference of the chest as accurately as possible, and it was evident that the right side was an inch smaller than the left; the latter expanded much more than the former, and the right intercostal muscles were in violent action, endeavouring to increase the depth of the right thoracic cavity, and thereby facilitate the entrance of air.

March 14, 5 o'clock. Very feeble respiration in the right lung. On applying the ear to this side, and placing the hand over the back, so as to come in contact with the ribs on the left side, the latter are felt moving freely, while the ribs under the ear are comparatively fixed.

March 15, 10 o'clock. Drs. Popham and Hare, after a careful examination, concluded that the right side did not expand as much, nor yield as loud a respiratory murmur, as the left. It is difficult to determine if dysphagia exists, but the animal appears to have slight difficulty in swallowing fluids.

I have repeated this experiment on a rabbit with the same result.

I have thus succeeded in proving, *that interrupting the functions of the pneumogastric nerve produces feeble respiration in the corresponding lung; hence, feeble respiratory murmur on one side of the chest cannot be considered as proof of a pulmonary lesion; nor is it necessary that an air-tube should be compressed to produce this phenomenon.*

who have written on the subject, and whose opinions will now be briefly alluded to.

Wardrop^a remarks, that in aneurism of the innominata “the tumour rises up from below the sternum and on the tracheal edge of the sternal portion of the mastoid, at which place the vessel is most uncovered; the situation of the tumour, however, varies according to the part of the artery that is affected:” he goes on to state, that “the force of the pulse is usually diminished in the branches of a trunk affected with aneurism; and when the innominata is the seat of disease, the circulation in the subclavian and carotid will be more or less influenced.” Dr. Crisp observes^b, “that the *bruit*, if any be present, will be heard on the right and upper part of the sternum; that turgescence of the veins of the neck, and occasionally œdema of the hand and arm, will result from the pressure of the tumour; that the pulse in the right radial will generally be found smaller than in the left, and be sometimes absent.” The French Inaugural Dissertations contain notices of cases considered in their surgical relations, without presenting any remarks on the diagnosis of these diseases. M. Dubrueil states^c, that the symptoms of innominatal aneurism advance much more rapidly than those of aortic, and that the appearance of a tumour in the neck is not followed by the same amount of relief from the most urgent symptoms in the latter as in the former case; that the greater portion of the tumour is extra-thoracic in one, and intra-thoracic in the other; that venous congestion of the head, apoplectic symptoms, œdema of the face and right arm, occur in innominata aneurism; that, as a general rule, the pulse on the side corresponding to the aneurism is weaker, in some cases scarcely perceptible, and not synchronous with its fellow, so much so that in some cases the

^a Wardrop on Aneurism, p. 84, *et seq.*

^b On the Structure, Diseases, and Injuries of the Blood-vessels, p. 204.

^c Obs. et Réflex. sur les Anévrysmes de la Portion Ascend. et de la Crosse de l'Aorte, p. 120, *et seq.*

right radial pulsates after the left; that the right common carotid pulsates weaker than the left; and that it is to the combination of these symptoms we must look for the diagnosis, as no one is pathognomonic. M. Robert^a is of opinion, that when the tumour pulsates under the insertions of the right sterno-mastoid muscle, and presents single pulsations, we may almost conclude that the innominata is the seat of the disease (double pulsation being considered by this author as indicative of aortic aneurism^b). M. Velpeau's^c remarks are similar to those of M. Robert, but he enters more fully into the details of treatment by operation. In the article on this subject in Rust's Dictionary^d, the principles on which the diagnosis is to be made are, that innominatal aneurism appear at one side of the right sterno-mastoid, and is accompanied by weak pulsation in the right carotid and subclavian.

It may be stated, in general terms, that the difficulties in forming a correct diagnosis are in proportion,—

1st. To the liability of the diseased part changing its position.

2ndly. To its anatomical relations rendering it liable to be confounded with disease of the adjacent organs.

3rdly. To its affording indications but little susceptible of being appreciated by our senses.

4thly. To our imperfect anatomical and physiological knowledge of the diseased structure.

The great difficulty in ascertaining the exact position of aneurisms of the great vessels is referrible to the first two conditions; and of this the following case, recorded by M. Martin Solon^e, is an illustration:—

A woman, aged 67 years, suffering from dyspnœa and pal-

^a Sur les Anévrysmes de la Région Sus-claviculaire, p. 89.

^b *Op. cit.*, p. 70.

^c Dictionnaire de Médecine, vol. xxviii. p. 466, *et seq.*

^d Theoretisch-Praktisches Handbuch der Chirurgie, vol. ii. p. 57.

^e Quoted in the Thèse, by M. Bestegui, 1841, No. 195, Obs. 1st.

pitations, was seized with giddiness, and lost consciousness for some hours in December, 1834; face swelled, lips blueish, right pulse becoming gradually weak. On admission to the Hôpital Beaujon, in May, 1835, no pulsation could be felt in the right arm as high as the brachial; upper part of sternum distinctly protruded, giving a dull sound on percussion; a murmur and pulsation, very faint, but synchronous with the pulse, are heard over the dull portion; a *bruit de soufflet* is audible where the subclavian becomes axillary; heart pulsates a little lower down than usual, and a murmur accompanies the first sound; veins on the chest are very prominent, especially at the right side; arms œdematous, more particularly the right, and its temperature is a little lower, but its sensibility remained as acute as that of the opposite arm. *Diagnosis*.—Vast aneurism of the innominata or subclavian; a mass of clot preventing the pulsations being more distinctly felt, and obstructing the circulation in the right arm. Two months after admission, the left arm and veins on that side of the chest became as much swollen as the corresponding parts on the opposite side; intense dyspnœa and dysphagia, with general serous effusion, occurred before her death on the 22nd February, 1836.

Post mortem.—An aneurismal sac, the size of a full-grown foetal head, arose from the extreme right of the transverse portion of the arch of the aorta; the superior vena cava and venæ innominatæ were obliterated, as was also the arteria innominata which lay to the left and behind the tumour, the opening from the aorta into that vessel being completely closed by a membranous diaphragm; the sac pressed posteriorly against the right bronchus, pushing the trachea and œsophagus far to the left side of the vertebral column. To the right, and external to the obliterated vessels, was a sort of aneurismal diverticulum, as large as an orange, which compressed the upper part of the right lung against the ribs; between this pouch and the lung, the phrenic nerve was seen flattened and incorporated with

the walls of the sac. The aneurism was continuous inferiorly with the ascending aorta, and had displaced the heart downwards; the compressed portion of the right lung was infiltrated with melanotic matter, and presented some softened tubercles scattered through it. (The preparation is in the Dupuytren Museum.)

This case presents us with a set of phenomena that would seem at first sight to be conclusive of the disease being innominatal; but in order to cause these symptoms the sac must be of great size, and the position of the arch allows it to be enormously dilated without producing an external tumour, while an innominatal aneurism would have appeared in the neck long before it caused such well-marked symptoms; if the left carotid or subclavian had been examined, a murmur would probably have been heard in them, or along the spinal column posteriorly; nor could an innominatal aneurism displace the heart downwards.

The following case may be advantageously placed in contra-distinction with that just given, as showing that an aortic can be diagnosed from an innominatal aneurism, though it should appear in the position usually occupied by the sac in the latter affection, and in order to secure the accuracy of the report, I give it in the words in which I took the notes and made remarks thereon three years ago.

Ellen Shea, aged 27, admitted to the South Charitable Infirmary, Cork, May, 1849, suffered from palpitations of the heart for the last eight months, which she supposes to have been caused by a fright. About five months ago she noticed, for the first time, a pulsation at the upper part of the sternum; the veins on both sides of the neck became turgid, and her face œdematous. A fortnight before admission to hospital, her ankles were occasionally swollen, and she had a dull, constant pain between the scapulæ, with, once or twice, slight pain down the right arm. Loss of voice at times; this she de-

scribes as a hoarseness coming and going from day to day. Never had dysphagia or dyspnœa; and her health is in general good, with the exception of occasional slight cough.

June 1st.—Respiration easy, and without stridor; veins at the right side of the neck very full. A pulsating tumour, larger than a walnut, is seen above the right sterno-clavicular articulation, occupying the space between the origins of the sterno-mastoid. Both sides of chest equally clear on percussion, except sternal third of the right clavicle, which is dull. Scarcely any respiratory murmur over the upper part of right lung, respiration loud over the lower part of this side, and in the entire of left lung: no râle in any part of the chest; heart's action quick, *bruit de soufflet* with both sounds, heard at the apex, loudest at the junction of the second with third division of sternum; above this point it becomes less distinct, and is replaced by another sound; well-marked thrill is felt over the tumour, and on applying the stethoscope a loud double sound is heard, accompanied by a harsh, rasping, double murmur, loudest immediately below the right sterno-clavicular articulation, but audible over the entire chest, more particularly on the right side. When the stethoscope is passed in the direction of a line drawn across the chest from the right sterno-clavicular articulation to the apex of the heart, the aneurismal murmurs are heard becoming less distinct until we reach about midway between the tumour and heart's apex; at that point it is replaced by another double murmur of a much softer tone, and which becomes more intense as we approach the heart,—this latter double murmur is that before mentioned as accompanying the heart's action.

Here, then, we have two points of pulsation within the chest, each presenting a double sound, and each giving origin to two sets of double murmurs,—one, the aneurismal, harsh; the other the cardiac, soft; pulse 84 in both wrists, and of equal volume; thrill and *bruit* in carotid and subclavian arteries on *both* sides; *double* sound and murmur are heard down the back as low as

the fifth dorsal vertebra, equally loud on both sides of the spine; lower down the *bruit* is still heard, but the sound is *single*. On the 5th of June she complained for the first time of a violent pulsation in the abdomen, accompanied by a feeling of faintness; "the beating in the neck has diminished;" a tumour, not well defined, can be felt in the epigastric region, pulsating violently, and accompanied by a very loud *bruit*; the pressure of the hand in this region causes a feeling of nausea and severe pain in the back. On the nights of the 13th and 14th of June she had great pain down the right arm, and the fingers became livid; since then she has not had an attack of this pain, and the pulsation of the abdominal aorta has diminished.

Remarks.—In this case we have a complication of diseases, which renders the diagnosis of the exact position of the aneurism a matter of some difficulty: I allude to the existence of valvular disease with aneurism. An aneurism of the innominata would not cause a *bruit* in the *left* carotid or subclavian, but aortic valve disease would produce murmurs in all the arteries; and thus the complication of valve disease with aneurism deprives us of an important diagnostic sign between aneurisms of the aorta and innominata. There can be but little, if any doubt, that the aortic valves are diseased, and that the aneurism is either of the innominata or arch of the aorta. If it were in the innominata, we would expect to have the following symptoms, viz.:—

1st. Dysphagia, dyspnoea, or stridor; the relation of the innominata to the œsophagus and trachea renders aneurism of that vessel more likely to cause these symptoms than an aneurism of the aorta.

2nd. A marked difference between the radial pulses.

3rd. Pain extending up the right side of the neck and head.

4th. Pain down the right arm would be an early symptom.

In this case, the first three symptoms are absent, and

the last has only occurred a few days past: so far we have negative proof that the aneurism is of the aorta. There is also disease of the aortic valves, hence I would infer, that the aorta itself is diseased; again, the aneurismal *bruit* is heard all over the chest, and there is a point on the sternum where it mixes, as it were, with the valvular *bruit*. The double *bruit* of the aneurism^a is propagated down the back as low as the fifth dorsal vertebra; and in addition to this, there is a set of symptoms that would lead us to suppose that there was a slight dilatation of the abdominal aorta just below the diaphragm. Are we not then justified in supposing, that in the case before us there is disease of the aortic valves, aneurism of the anterior and superior part of the transverse portion of the arch, and probably a dilatation of the abdominal aorta just below the diaphragm?

This diagnosis, made in opposition to the general opinion regarding the seat of the disease, has been confirmed by the *post mortem* examination, of which I cannot give any more particular account than, that she died in the North Infirmary, Cork, under Dr. Hobart's care, and aneurism of the transverse portion of the arch, with diseased aortic valves, were the morbid appearances; and although the first of the propositions on which this diagnosis was made has been now proved to be untenable, still it shows that aortic can be distinguished from innominatal aneurism, even though the tumour should appear in the position usually occupied by the innominatal sac.

The following conclusions, however erroneous and imperfect they must of necessity be, represent, I believe, the present state of our knowledge of the differential diagnosis of aneurisms of the transverse portion of the arch from those of the *arteria innominata*; and contain, I trust, "some of the elements of a diagnosis that clinical observation will bring to perfection:"—

^a Has double murmur been observed in any case of non-aneurismal intra-thoracic tumour? I believe this can be answered in the negative, and may form a most important diagnostic sign between aneurismal and all other tumours.

In aneurisms of the arteria innominata:—

I.—External tumour is a frequent and early sign, situated generally above the inner third of right clavicle.

II.—Arteries in right arm, and on the right side of neck and head, generally pulsate weaker than those on the left.

III.—Stridulous respiration, cough, dysphagia, alteration in the voice, and dyspnœa, are comparatively rare.

IV.—Pain, œdema, and enlargement of the veins, begin in right arm or the right side of neck and head; they may finally extend to the left side.

V.—Partial loss of motion or sensation in the right arm is a comparatively frequent symptom.

VI.—Dislocation of the clavicle, trachea, or larynx, a comparatively frequent occurrence.

VII.—Alteration in the intensity of the respiratory murmur occurs but very rarely, and then it is weaker in the right lung.

VIII.—Abnormal arterial murmurs in the right carotid or subclavian.

In aneurisms of the transverse portion of the arch:—

I.—External tumour occurs comparatively rarer and later, situated generally at the left side of, or under the sternum.

II.—Arteries in left arm, and on the left side of neck and head, generally pulsate weaker than those on the right.

III.—Stridulous respiration, cough, dysphagia, alteration in the voice, and dyspnœa, are comparatively frequent.

IV.—Pain, œdema, and enlargement of the veins, begin in left arm or the left side of neck and head; they may finally extend to the right side.

V.—Partial loss of motion or sensation in the right arm is a comparatively rare symptom.

VI.—Dislocation of the clavicle, trachea, or larynx, very seldom occurs.

VII.—Alteration in the intensity of the respiratory murmur occurs very frequently, and then it is generally weaker in the left lung.

VIII.—Abnormal arterial murmurs loudest in left carotid or subclavian; heard also along the spinal column posteriorly.

ix.—Pressure on the right carotid and subclavian diminishes or stops the pulsations of the tumour.

ix.—Pressure on the carotid and subclavian, on either side, has but little effect on the pulsations of the tumour.

